THE

AMERICAN GAS-LIGHT JOURNAL

DEVOTED TO

LIGHT, WATER, AND SEWERAGE.

Iron Buildings, No. 254 Canal Street, East, near Broadway, New York.

FIRST YEAR.—No. 11. NEW-YORK, TUESDAY, MAY 1, 1860. $3 PER ANNUM.

TO GAS-FITTERS AND PLUMBERS.

L. WAEFELER & CO., No. 94 BEEKMAN STREET, New York, have always on hand several hundred kegs WROUGHT-IRON GAS-PIPE HOOKS, of all sizes from ¼ to 2 inches. They are made of best quality horse-shoe nail iron, and warranted not to break.

Also, PLUMBERS' MATERIALS, such as China Wash-Basins, Closet-Basins, Pan-Closets, Bath Tubs, Boilers, Brass and Silver-plated Cocks, Brass and Iron Pumps, Hydraulic Rams, French Fountain Jets, &c., all at the very lowest prices.

Butts & Kendall,

(FORMERLY F. BUTTS & CO.,)

Dealers in

STERLING COAL,

Cleveland, Ohio.

The attention of Gas Companies is called to the following letters as to the merits of the above Coal, being a few of the many we have received, and from which we are led to believe that there is no English or American Coal which combines all the qualities desired in a Gas Coal as perfectly as the Sterling:—

Office of the Manhattan Gas Light Co.,
Irving Place, corner East 15th Street,
New York, January 13, 1860.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—Yours of 9th inst. is received. The "Sterling Coal" received from you during the past year worked very satisfactorily—averaging 9620 cubic feet of 15 candle Gas per ton of 2240 lbs, and 41 bushels of Coke, weighing 1465 lbs.

We consider it among the best of American Gas Coals, for the quantity and quality of the Gas produced, and also for the excellent quality of its Coke. I am, Gentlemen, your obedient servant,

CHARLES ROOME, President.

Office of the Rondout and Kingston Gas Light Co.,
Rondout, January 4, 1860.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—The 600 tons of Sterling Coal ordered from you in August, 1859, has now been in use over four months, to my entire satisfaction. Its average yield is 4, 40-100 feet, and a good strong light. The Coke produced equal in quality and quantity, to best English Caking Coals. It burns very freely with little clinker. In purification it is economical, using no more lime than New Pelton. It is superior to any American Coal I ever used. I shall be pleased to give you any further information at my office in New York. WM. W. HAGUE, 522 Broadway

The Cleveland Gas Light and Coke Co.,
Office, 195 Superior Street,
Cleveland, December 30, 1859.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—This Company has used between 3000 and 4000 tons of your "Sterling Coal," and are still using it with very satisfactory results. We find the average product of a ton of 2000 lbs. is about 8800 feet of Gas and about 37 bushels of Coke. The Gas is of good illuminating power and quite free from sulphur or other impurities, one bushel of lime purifying 9000 feet, and the Coke of very superior quality. The yield of Gas is about the same as from the Pittsburgh Coal, and the Coke better adapted to our use. Yours, truly, T. DWIGHT ELLIS, Sec.

Office of the Sandusky Gas Co.,
Sandusky, Jan. 16, 1860.

MESSRS. BUTTS & KENDALL:—*Gentlemen*:—This Company has used your Sterling Coal since July 3d, 1859, and are still continuing the use of it with satisfaction to the Company and consumers. The average product has been 8,629 feet of Gas per ton of 2,000 lbs, and 37 bushels of Coke of very superior quality. The Gas is as good as that obtained from Pittsburgh Coal. I consider it the best Coal ever used in our works. I am, gentlemen, yours respectfully,

WM. HUDSON, Sup't and Sec'y.

We would also refer to Gas Companies in the following places:—New York City (Manhattan and New York Co.'s), Albany, Troy, West Troy, Rochester, Oswego, Rondout, Kingston, Albion, Brockport, Seneca Falls, Elmira and Lyons, in the State of New York; Cleveland, Toledo, Sandusky, Norwalk and Oberlin, in Ohio; Detroit, Ann Arbor, Grand Rapids and Kalamazoo, in Michigan; Coburg, in Canada, and two Companies in Milwaukie, Wisconsin.

The extensive Mines of the Sterling Coal and Mining Company, in the western part of Pennsylvania (known as the Sterling Hills, and the highest in that part of the State), are wholly under our control, and the Coal is mined and sold only by us or our Agents. The average product of the Sterling Coal, per ton of 2,000 lbs., is 8,733 feet of 15½ candle Gas (4, 37-100 per lb.), and 37 bushels of Coke of very superior quality. Getting our Coal to this place by railroad, a supply can be had during the summer months (as well as at all other times), which is not the case with coals dependent upon high water for transportation, as are most or all other gas coals which are sent to the Lake ports for shipment. Our mining facilities are such, that we are prepared to ship extensively. For any further information address the undersigned, or M. BALLARD, Esq., Syracuse, N. Y., who is our Agent for that State.

BUTTS & KENDALL, Cleveland, Ohio.

CORNELIUS & BAKER,

MANUFACTURERS OF

LAMPS, CHANDELIERS,

GAS-FIXTURES, &c.

MANUFACTORIES,

821 CHERRY STREET,

AND

FIFTH STREET AND COLUMBIA AVENUE.

STORE, 710 CHESNUT STREET,

PHILADELPHIA.

LAND IN CANADA FOR GAS-LIGHT SHARES.

Town of Coburg,	Northumberland Co	.....	14 acres.
Do Hamilton,	do	do	100 "
Do North Monaghan,	Peterborough	do	600 "
Do South do	do	do	100 "
Do Dummer,	do	do	100 "
Do Douro,	do	do	223 "
Do Haldimond.	Northumberland	do	200 "

These lands are well located, and will be exchanged on equitable terms for sound, dividend paying gas-light shares in the United States or British Provinces.

Apply or address E. R. L., Post-Office, Toronto, Canada, or at Rooms of AMERICAN GAS-LIGHT JOURNAL, New York.

CLAY RETORTS.

J. K. BRICK & CO.

BROOKLYN CLAY RETORT AND FIRE-BRICK Works, Van Dyke, near Van Brunt street, Brooklyn, N. Y.—Manufacturers of Clay Retorts, Fire Brick, Gas and Hot House Tiles, Arch, Furnace and Cupola Brick, Fire Cement, Mortar, &c.

J. K. B. & Co. would invite the attention of Gas Companies to the important fact, that the Clay Retorts manufactured at their Works can be set without Tiles, requiring to be supported only at the front and rear ends, thereby exposing the entire surface of the Retort to the direct action of the flame from the furnace.

The results of this mode of setting, are a Saving of Fuel, Tiles, Transportation of Materials, Labor and Space, thereby enabling Gas Companies to set Retorts of at least 50 per cent. greater capacity than those usually employed in the ordinary arches.

JOHN COX & CO.

No. 696 BROADWAY, CORNER FOURTH STREET, NEWYORK.

IMPORTERS OF FRENCH AND ENGLISH GAS Fixtures of every description, Paris Clocks, Real Bronzes, &c. Manufacturers of Silver Ware.

FELLOWS, HOFFMAN & CO.,

(Late STARR, FELLOWS & CO.,)

MANUFACTURERS OF GAS-FIXTURES AND Chandeliers, Solar, Camphene and Fluid Lamps Girandoles, Hall Lanterns, &c., No 74 Beekman st., New York.

W. ANDERSON,

MANUFACTURER OF GAS-BURNERS, NEW HAven Railroad Depot, cor. of Franklin and Elm sts., New York. Scotch Tips constantly on hand. Tips and Burners made to order. Brass Tips for street lights and other purposes made to order.

WATERHOUSE & BOWES,

BUILDERS OF GAS-WORKS, RALEIGH, N. C. Gas-Works erected in any part of the United States.

REFERENCES.

James H. Carson,	President	Charlotte	N. C.	Gas-Works,
D. G. Fowle,	do.	Raleigh	N. C.	do.
J. C Smythe,	do.	Salisbury	N. C.	do
Arch. McClean,	do.	Fayetteville	N. C.	do.
Joseph A. Waddell,	do.	Staunton	Va.	do.
A. G. Story,	do	Little Falls	N. Y.	do.
George H. Young,	Proprietor	Waverley	Miss.	do.

Wm. Johnston, President of Charlotte & S. C. R. R., Charlotte, N. C.
A. B. Wood, Agent Reading Iron Works, 57 Maiden lane, N. York.
Cornelius & Baker, Manufacturers of Gas-fixtures, Philadelphia.
G. B. WATERHOUSE. M. BOWES.

JOHN HEARN & CO.,

DEALERS AND MINERS IN

AMERICAN GAS-COALS.

ERIE., PENN.,

Would call the attention of Gas Companies to the superior quality of our Coals.

For the past ten years they have been used by a majority of the Gas Companies in the State of New York, west of Albany and Troy. And also, by the Gas Companies in the cities and towns of the North-Western States, and, during the past year, by the East Troy Gas-Light Company, Albany Gas-Light Co., and Manhattan Gas-Light Co. of the city of New-York,—all of which heretofore used English Coals.

Owning our mines and a fleet of vessels on the Lakes, having no Railroad transportation, and only 70 miles of canal from this city, or 140 miles of canal and Lake from Buffalo to the coal fields, being 175 miles less of transportation for Coal to the Seaboard, than any Coal Depot on the Lakes, and having an Agency in Buffalo for the transhipment of our Coals only, it is unnecessary to say that parties purchasing of us, will get their Coal at first hand, saving, thereby, commission to managers, and 175 miles of extra Railroad and Lake transportation.

A working average of our Beaver Coal is 9,500 feet of 16 Candle Gas, and 40 bushels Coal to the ton of 2,240 lbs.

The Manhattan Gas-Light Co of New York having thoroughly tested the Gas Coals of Pennsylvania and Ohio, the following extract from a letter to us will speak for itself:

"MANHATTAN GAS-LIGHT COMPANY,
"New York, June 15th, 1859.

"Messrs. JOHN HEARN & Co.,
Erie, Penn.:

"GENTLEMEN,—This Company has a contract with your firm for the delivery of five thousand tons of Gas Coal, half each Beaver and Mount Carbon, at $ —— per ton of 2,240 lbs.

"The cargo which has been received is satisfactory, and as we shall need 15 or 20 thousand tons more, to be delivered through the present summer, we beg you to advise us whether you desire to increase your contract. We have applications from various parties who desire to supply the Company, but shall be satisfied to get a larger quantity of your Coals, provided you can serve us on terms equally favorable with others.

"For the Gas Co.,
"HENRY YOUNG."

We are prepared to contract for the delivery of our Coals in the City of New York, or the cities and towns on the Hudson River.

PITTSBURG GAS-COAL. THE DUQUESNE COAL Company, whose mines are located eight miles from Pittsburg, on the Pennsylvania Rail Road, are now ready to fill orders for the above well known Coal.

Address the Proprietors, J. G. MACFARLANE & Co., at their Coa Office, No. 675 Liberty Street, Pittsburg, Pa.

GAS ROSINS, ROSIN-OILS AND COAL-OILS, adapted to the Manufacture of Gas. For sale by

HORATIO EAGLE Agt.,
254 Canal-st, N. Y.

SCOTCH BOGHEAD COAL.—1,000 TONS OF THIS Superior Coal, for Gas and Oil Making purposes. For sale by

HORATIO EAGLE, Agt.,
254 Canal-st., N. Y.

GAS AND OIL-COALS, FOREIGN AND DOMESTic.—Orders promptly executed at the lowest market prices. For sale by

HORATIO EAGLE, Agt.,
254 Canal-st., N. Y.

BUTLER'S PATENT PORTABLE GAS-WORKS are designed for Dwellings, Churches, Factories and Country Villages, as well as for large consumers in cities. They make gas from CRUDE ROSIN, and are WARRANTED to make as rich an article, at less than ONE-HALF the cost of that made by the old method in Portable Gas-Works, and at one-third the average price of Coal Gas as sold in cities. Great savings in expense of light GUARANTEED to large consumers.

Works of all sizes furnished to suit applicants. Mains, Service and Distributing Pipes put in. Also, a large assortment of Gas-Chandeliers, and other fixtures, always on hand, at the lowest prices.

The MANSION HOUSE, BROOKLYN, with 250 burners in constant use, make their own gas with my apparatus, with results as stated above. This, (with a small one at my store,) can be seen in operation by application at my office, where descriptive pamphlets, with the names of numbers who are using them, will be furnished.

JOHN BUTLER,
Nos. 112 Fulton and 15 Henry street, Brooklyn, N. Y.

J. H. BRUNDAGE & CO.,

38 BURLING SLIP, NEW YORK, DEALERS IN

ROSINS ADAPTED ESPECIALLY TO GASMAKERS' USE.

N. B.—J. H. B. & CO. ARE CONSTANTLY PURCHASERS OF ROSIN-GAS TAR.

Office for the Inspection of Gas Meters,

FOR THE STATE OF NEW YORK.

AGENT FOR

Scammon's Celebrated Gas Apparatus,

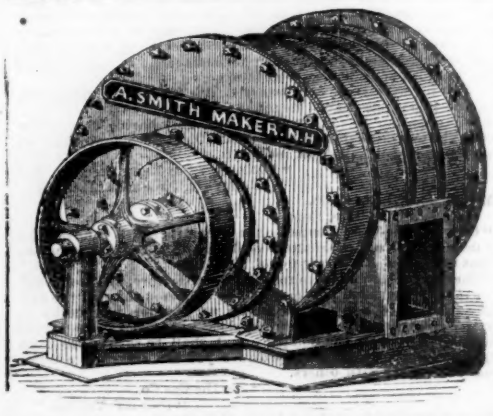
FOR EITHER COAL OR ROSIN GAS.

GAS-FIXTURES OF ALL DESCRIPTIONS.

GAS-FITTING.

GEORGE H. KITCHEN & CO.,

561 BROADWAY, NEW YORK.



THE ABOVE CUT REPRESENTS MACKENZIE'S PATENT GAS EXHAUSTER (Force Blast.)

It is offered to Gas Companies as a most perfect Machine. They are made of various sizes, capable of exhausting from 5,000 to 150,000 cubic feet per hour.

They require less power, work smoothly, are not so liable to get out of order, and cost much less than the imported ones.

Gas companies intending to use an exhauster, by stating the quantity of gas they may wish to have pass through per hour, will be furnished with a statement of the proper size, and the price of the same, on application to ADDISON SMITH, Manufacturer, New Haven, Conn., or to Messrs. ELLIMAN BROTHERS, New York.

The manufacturer has the liberty to refer to the Albany, N. Y., Gas Light Co., where one has been in constant operation for many months. Another one, capable of exhausting from 50,000 to 70,000 cubic feet per hour, will be in operation in a few weeks, at the St. Louis Mo., Gas-Works.

WILLIAM ROY,

93 Beaver Street.

NEW YORK, IMPORTER OF THE CELEBRATED PERCETON FIRE-CLAY RETORTS the quality of which is superior to any other clay yet discovered. Analysis as under :

Silica	62.5	Magnesia	0.3
Alumina	35.0	Prox. of Manganese	0.2
Prox. of Iron	0.9	Phos. of Iron	0.5
Lime	0.6		

VITRIFIED FIRE-CLAY PIPES, from 2-inch to 36-inch, diameter, in lengths of two or three feet; are indestructible, and not affected by gases or acids.

Thomas Edington & Son's PATENT CAST-IRON PIPES are cast vertically to any weight required. They can also be coated with Dr Smith's Solution, which prevents corrosion; adapted for gas and water. Made in lengths of nine and twelve feet, or turned and bored joints.

WROUGHT IRON TUBES and all materials for gas and water works Fire-Bricks, Fire Clay, Water Hydrants, Scotch and English Canne Coal, &c. Kennedy's Water Meters for measuring the flow of water—indispensable to all water companies.

FRINK'S GAS-LIGHT REFLECTORS

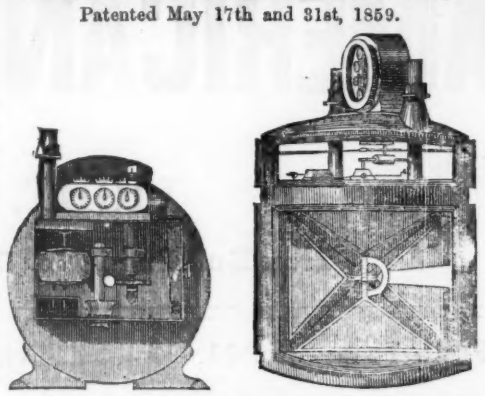
FOR SHOW WINDOWS, BILLIARD TABLES, Desks, Churches, Halls, &c.

Frink's improved Day-Light Reflectors for obviating the use of Gas entirely in the day-time Frink's Gas-Light Reflecting Shades for Banks, Offices, Parlors, &c. Frink's Concave Gas-Light Reflectors. No. 68 Barclay street, near Greenwich street, New York.

HARRIS & BROTHER'S

Improved Dry Gas-Meter,

Patented May 17th and 31st, 1859.



HARRIS & BROTHER,

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS-METERS AND GAS-APPARATUS,

No. 1117 Cherry St., Philadelphia.

CANNEL and COAL

OF THE BEST DESCRIPTIONS

FOR MAKING GAS AND COKE.

ANALYSES OF CANNEL,

Showing, from the most recent tests, the productive power (in volume) of each kind of material.

	GAS. Per ton, 2240 lbs. In Cubic Feet. At 60° temperature.	COKE. Per ton, 2240 lbs. Cwt.	Qrs.	Lbs.	Quality of Coke.	Ammonia Water in Gallons.	Tar in Gallons.	Illuminating power * per burner consuming 5 feet Gas per hour.	Price per ton free on board vessels in Liverpool	Price at $4.80 per £ sterling.
1	11,700	13	2	7	ood.	16	19	22.50	17s.	$4.08
2	11,000	13	1	16	"	18	16¼	21.25	15s. 6d.	3 72
3	10,000	11	2	0	Inferior.	25	15¼	20.00	14s.	3 36

ANALYSES OF COAL.

No.	GAS Per ton, 2240 lbs. In Cubic Feet.	COKE. Per ton, 2240 lbs. Cwt.	Qrs.	Lbs.	Quality of Coke.	Ammonia Water in Gallons.	Tar in Gallons.	Illuminating power * per burner consuming 5 feet Gas per hour.	Price per ton free on board vessels in Liverpool.	Price at $4.80 per £ sterling.
1	11,000	13	1	16	Good.	16	11⅛	14.00	11s. 6d.	$2.76
2	9,690	13	3	0	"	27	10	10.40	9s 6d.	2.28
3	9,300	13	2	0	"	24	12	9.30	8s. 6d.	2.04

* Equal to Spermacetti Candles, burning 120 grs. per hour.

The above analyses embrace the best Cannel and Coal raised in the Lancashire, &c., districts, and are tabulated, for safety, rather below the average results. They are large, well screened, and free from dirt when delivered on board vessels, and are used for gas purposes at the chief gas works in England and on the Continent.

Orders for less than 50 tons, (*i. e.*, a boat load,) will be charged the cost of carting, viz., 1s. 6d. per ton.

The prices quoted will in all cases be subject to such alterations, more or less, as the case may be, as may arise in the market between the issue of this offer and the time at which the order may come to hand.

TERMS:—Cash, on presentation of the bills of lading at your bankers or agents in Liverpool, or as may be otherwise arranged, less 2½ per cent. discount

Also, HAND PICKED CANNEL and COAL, for house use.

Concessions in prices made for large quantities.

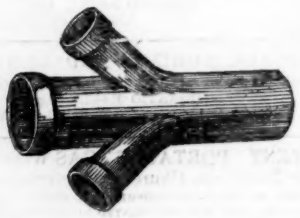
GAS APPARATUS of all descriptions and on the most approved principles. Also, Purifying and other materials supplied.

ANALYSES, PLANS, and ESTIMATES, and other information required, and the highest references, furnished on application.

Contracts for materials and works entered into. No charge made for superintending shipments, preparing bills of lading, or passing entries.

EMANUEL TURNER & CO.,

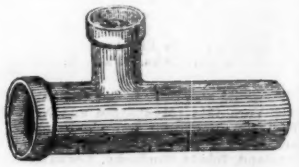
Export Offices, 34 Castle street, Liverpool, England.

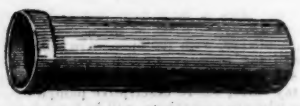


GAS, STEAM, SMOKE, PURE WATER AND SOIL PIPE,

CLAY RETORTS, TILES, BRICKS,

AND EVERY VARIETY OF FIRE GOODS.





JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS,

Near Leeds, England.

T. W. PARMELE, Agent, No. 4 Irving Place, New York.

CELLULAR GAS RETORTS. C. M. CRESSON'S CELLULAR GAS Retorts, Patented October 3d, 1854. Adapted to the manufacture of GAS from Rosin, Coal, Wood, &c., and now in use at the Philadelphia Gas Works. Patent Rights for sale. For information apply to HENRY S. HAGERT, Attorney for Patentee, S. E. cor. of Walnut and Sixth streets, Philadelphia, Pa.

ALFRED F. JAMES, Collection, Exchange and Land Agency, Galveston, Texas.

REFERENCE—John B. Murray, New York.

R. D. WOOD & CO., Manufacturers of Cast Iron, Gas and WATER PIPE; RETORTS, LAMP-POSTS, &c. S. W. corner 4th and Chesnut streets, Philadelphia. Works at Millville, N. J.

LOCKE & CRAIGIE, Plumbers and Gas-Fitters, No. 12 East 20th street, New York.

LOCKE, CRAIGIE & CO., Gas-Fittings, Chandeliers, Brackets, Globes, &c., No. 927 Broadway, New York.

☞ Particular attention paid to country work.

MORRIS, TASKER & CO., PASCAL IRON WORKS, [ESTABLISHED 1821]

PHILADELPHIA, manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap Welded Boiler Flues,

GALVANIZED WROUGHT IRON TUBES,

ARTESIAN WELL PIPES,

of Wrought or Cast Iron, screwed together, flush inside and out; Gas-works Castings, Retorts and Bench Castings for Coal gas works; Cast Iron Street Mains, Bends, Branches, Drips, &c.

GAS AND STEAM FITTERS' TOOLS, &c.

STEPHEN MORRIS, CHAS. WHEELER,
THOMAS S. TASKER, STEPHEN P. M. TASKER.

MANHATTAN SAVINGS INSTITUTION, No. 644 Broadway, New York. Assets, January 1st, 1859, $1,183,600 98. Open daily from 9 A.M., to 7 P.M.

A. A. ALVORD, Secy. E. J. BROWN, Prest.

D. APPLETON & CO., Importers and Dealers in American and Foreign Books, publishers of Appleton's Railway Guide and of Appleton's Dictionary of Mechanics—a work indispensable to all engaged in the manufacture of Gas. 346 Broadway, New York.

JOSEPH LENNIG & CO.,

Nos. 313 and 315 NEW MARKET STREET, above Vine street,

Philadelphia, Pa.,

Invite particular attention to their

Patent Excelsior

ROTARY VALVE,

And Patent

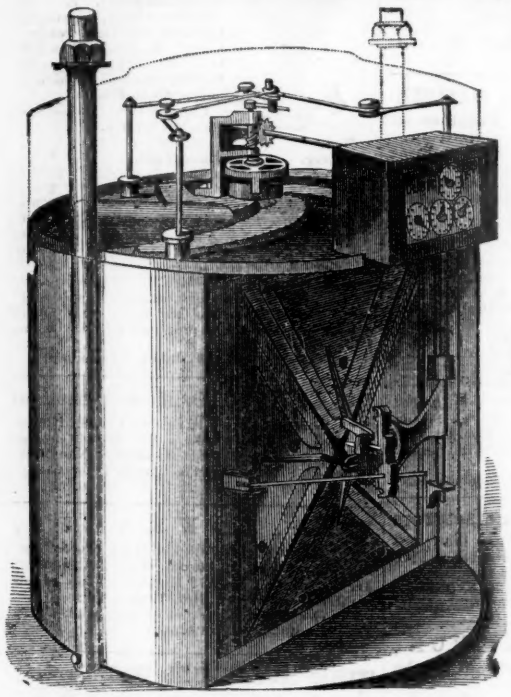
INLET CONDENSING CHAMBER

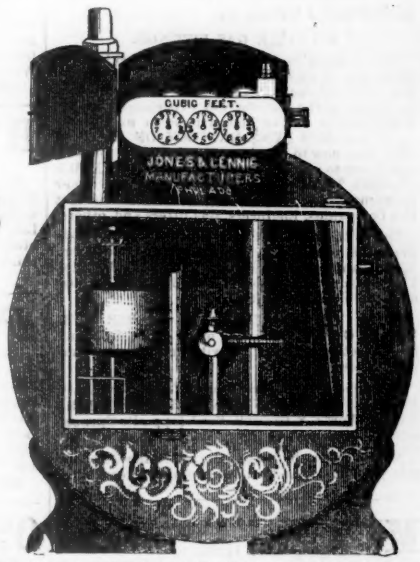
DRY GAS-METER,

And to their

UNSURPASSED

WET GAS-METER.





Both of which are certified, by experienced Gas-Engineers, Builders and Superintendents of Gas-works to be equal, if not SUPERIOR TO ANY OTHER METERS MADE.

An impartial trial and examination will *convince* every *intelligent* and *unprejudiced* mind of the *vast superiority*, not only of their *utility*, but also of their *Workmanship* and *Materials*. The materials used in their construction are *unsurpassed* in quality, and *undoubted* satisfaction is *guaranteed* to all purchasers.

Our Manufactory is now one of the *most extensive* in this Country, and we are thereby enabled promptly to execute orders to *any extent required*.

Our Meters speak for themselves, and we *caution* Engineers and Gas Companies against believing or being misled by *libelous circulars*. *Gas Officers are too intelligent to be deceived by such a series of misrepresentations.* We challenge superiority in both our Wet and Dry Meters.

MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS

MANUFACTORIES

SUFFOLK ST. CLERKENWELL GREEN. & ALLEN ST. GOSWELL ST. LONDON.

THOMAS GLOVER introduced his PATENT DRY GAS METERS into the United States and Canadas in 1846, and since that time he has received extensive patronage from many Gas Companies of those countries as well as from this. Thomas Glover confines his sole attention to the business of Gas-Meter making. The propriety of his doing so is satisfactorily proved by his success. For example: one London Company has now in use above 12,500 of his Patent Dry Gas-Meters, and some of these Meters have been fixed for fourteen years and are still in working order, without complaint from either the company or the consumer.

THOMAS GLOVER thinks it necessary to put Gas Companies on their guard against parties selling Patent Dry Gas-Meters constructed in imitation of his, but unskilfully made on erroneous principles, and with improper and unsuitable materials.

THOMAS GLOVER'S Workshops are now the most extensive in this or any other country, and he is thereby enabled promptly to execute orders to any extent required. Purchasers may, at any time, inspect his Works and the materials of which his Meters are constructed.

Suffolk Street, Clerkenwell, London, and 1 Barrett Street, Fulton Street, Boston.

JOHN ROGERSON & CO., New-CASTLE ON-TYNE & Middlesbro'-on-Tees, London, supply Gas Coal, Clay Retorts, Cast Iron Pipes and Retorts, Gasometers, &c. A partner of the above house being now in this city, will be glad to wait upon any gas company requiring supplies. Agents, MEAD & BELL, 17 William street, New York.

GAS-COAL.—PENN COAL CO.— The Penn Coal Company having completed arrangements for mining and shipping coal on an extensive scale, are now prepared to receive orders. The mines are favorably located on the line of the Pennsylvania Railroad, 26 miles east of Pittsburgh, Pa. The coal has been tested by many gas works, and the highest testimonials will be furnished. Communications addressed to Mr. A. L. Massey, Philadelphia, will have immediate attention

GROVER & BAKER'S celebrated Noiseless Sewing Machines, at greatly reduced prices, No. 405 Broadway, New York.

THE WILLCOX & GIBBS' FAMILY Sewing Machines. The best family machine in the market, prices from $30 to $50. 504 Broadway, New York.

NORRIS & GREGG,

DEALERS IN WROUGHT IRON Pipe, and Manufacturers of Fittings for Steam, Gas, and Water, Nos. 62 and 64 Gold street, (between Beekman and Fulton streets,) New York.

THOMAS H. NORRIS. CHARLES GREGG.

WHEELER & WILSON'S Sewing Machines, No. 505 Broadway, New York. The very best in use. Send for a circular.

F. A. SABBATON, ALBANY, N. Y., Gas Engineer and Contractor. COAL AND ROSIN WORKS of any capacity constructed on the most approved plans.

Refers to CHARLES ROOME, Esq., Prest. Manhattan Gas-Light Co., N. Y.; R. PUMPELLY, Esq., Prest. Albany, N. Y., Gas Light Co.,; J. K. BRICK, Esq., Engineer Brooklyn, N.Y., Gas Co.

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(For engravings see AMERICAN GAS LIGHT JOURNAL for December, 1859, page 100.)

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OFFICIAL.

NEW YORK STATE INSPECTOR of Gas-Meters, ; Office 561 Broadway.

Gas-meters proved since 4th May, 1859..... 16,811
Number of proving apparatus tested..... 36

NEW YORK, April 30, 1860.

GEORGE M. KITCHEN,
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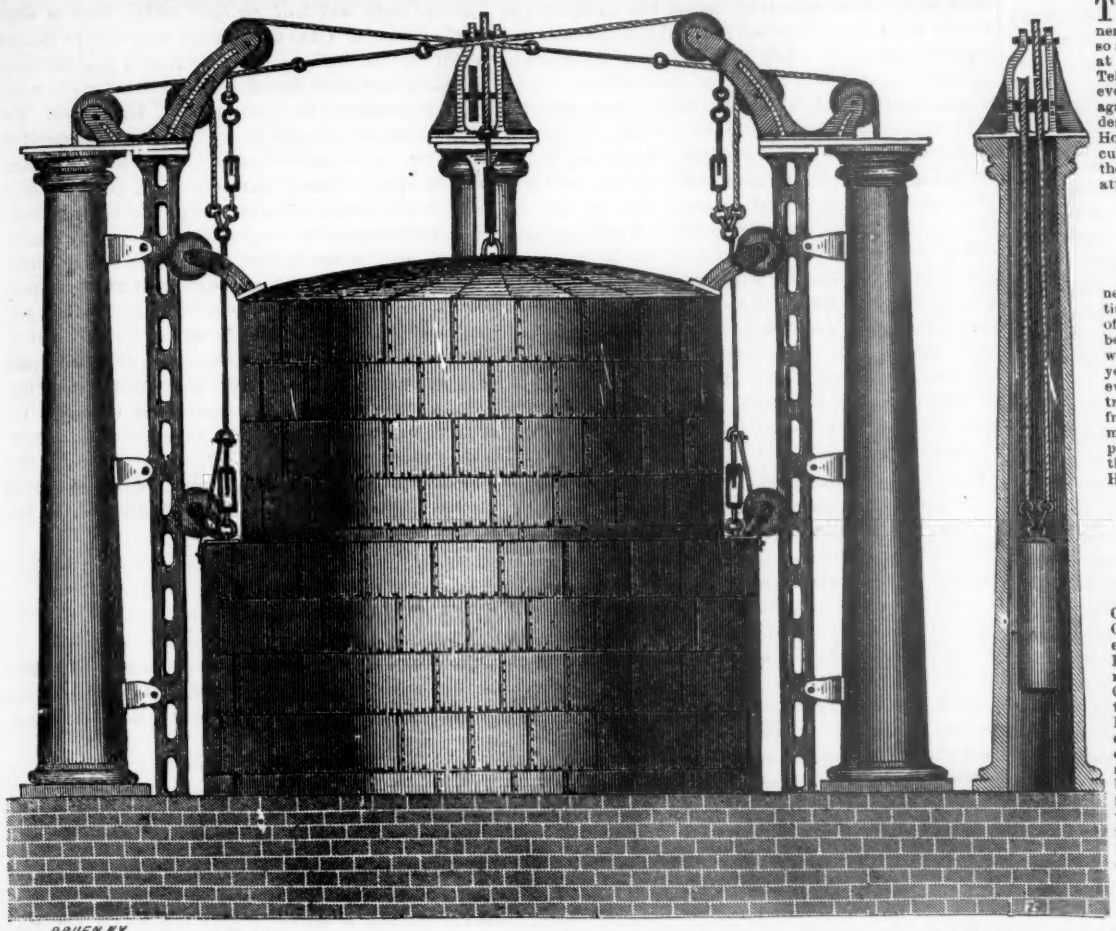
BURTIS' PATENT
COMPENSATING COUNTER-BALANCE FOR GASOMETERS.



THE Improvement consists in making the attachment to the Gas-Holder by counterweights in such a manner as to effectually prevent it from getting out of level so as to bind, and also to prevent any escape of Gas at Cup or Hydraulic seal, where the Holder is on the Telescopic plan. Holders that work out of level, are thus evenly balanced, and prevented from binding or lodging against Tank wall and falling down thereby being rendered unfit for service. Where Holders or sections of Holders cannot be used on account of the above difficulties, this arrangement will remove them, and place the Holder in good working order; moreover, with this attachment, deep tanks are not necessary.

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CHICAGO, ILL., GAS LIGHT AND COKE CO., August 9th, 1860.

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S. B. COBB, Acting Director,
JAS. K. BURTIS, Secretary,
C. BALDWIN, Ass't Secretary,
Of Chicago Gas-Light & Coke Co.

CHICAGO, ILL. August 9th, 1858.

We the undersigned would recommend to all Gas Companies which may have or are about to erect large Gas-Holders (whether Telescope or Plain Holders) to examine the ingenious yet simple contrivance for which P. T. Burtis has received a Patent. Having put the new invention on to a Gas-Holder for the Chicago Gas Company, which is one hundred feet in diameter, with two sections of twenty feet each, being a Telescope Holder, we had the best opportunity possible to see its effects. The Holder worked badly, the Guides being out of line so that it had to be helped often when it bound, so much so that it was almost impossible to work the lower section; and now since we put on the Compensating Balance, which was nearly one year ago, it has not varied one inch from a true level, nor required any care from the first day we applied it. It might with propriety be called the Automaton Balance, taking the weight off one side and putting it on the other when requiring it.

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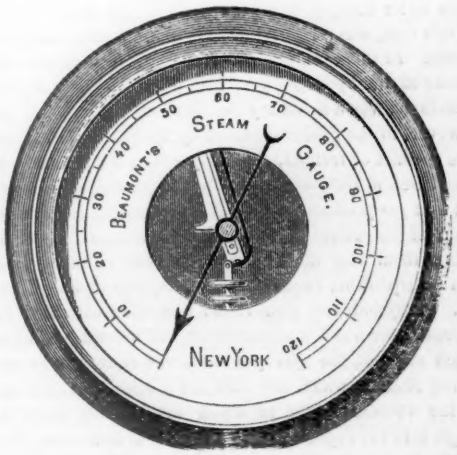

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ON THE MANUFACTURE OF HYDRO-CARBON GAS.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

SIR,—Ever since the first application of coal to the manufacture of illuminating gas, efforts have been made to supplant its use by the adoption of other means of production; instead of directing all the skill and mental energy to render one of the cheapest of substances—coal—less open to the serious objections it lay under, attempts have been made, from time to time, followed by partial success, to substitute some other substance whose decomposition might yield illuminating gas of a high character.

The nature of various coals being so diverse as regards the proportion of bituminous matter in their composition, a corresponding variation resulted in the nature of the distilled gaseous products, and hence before the difference in the raw material was studied, great disappointment was felt at the results, and an uneasiness and distrust as to the possibility of depending on coal for an extensive supply of rich gas.

Even when an abundance of gas was obtained, numerous other substances were produced with the carburetted hydrogens, some of which were of negative worth, and some of positive injury. The separation and removal of these required years to accomplish imperfectly, and the completion of these processes is yet a desideratum. Thus, it is scarcely to be wondered at that men should have adopted other means and sources for producing gaseous hydro-carbons.

When resins and fish oils were tried, it was found that the gas produced was too rich, or contained too large a proportion of olefiant gas and hydro-carbons of a similar composition, and the idea of diluting the gas was developed. As the diluting ingredient must also be a combustible, hydrogen was selected as the most available gas, and almost all of the boasted improvements in water-gas, and hydro-carbon gas manufacture, turn upon the modes of producing hydrogen and making it unite with other combustible and illuminating gases.

Indeed, after all, these combinations of gases separately produced, are but imitations of what occurs in the ordinary distillation of coal where almost one-half of the whole is hydrogen gas, and at least one-fourth carburetted-hydrogen.

The mode of producing illuminating gas by the formation of hydrogen gas and the subsequent carburation of the gas by passing through it or bringing it into contact with a hydro-carbon, dates back distinctly thirty years. The foundation of this application, that is, the true discovery, belongs to the times of Cavendish and Lavoisier, the latter of whom showed the production of hydrogen by the decomposition of water, when brought into contact with the heated surface of metallic iron.

Messrs. Pinkus and Collier, of London, obtained a patent in England, in 1830, for improvements in the manufacture of gas, which consisted in decomposing bituminous substances and admitting subsequently into the retort an excess of ammonia or of hydrogen gases. The object of these was to unite with any free oxygen and form water thereby, and thus preserve the retort, which in this case, was a revolving one, divided into compartments. In this case the patentee did not point out the source of the hydrogen gas, nor does it appear that its abundance was a necessary condition of success; not so, however, in the patent obtained by Michael Donovan, an able chemist of Ireland, who proposed in his patent—obtained Oct. 6, 1830—to utilize hydrogen-carbonic oxide, and that gas produced by the chemical action of water or steam on the surface of red hot coke or charcoal, by combining them with the vapors of the volatile substances, such as turpentine, vegetable resins, naphtha and naphthaline. A cylindrical iron retort was filled with coke or charcoal, over which water or steam was thrown, and then heated red hot, the gas produced was conveyed to the burner, close to which was attached a vessel or recipient for the volatile liquid in which the gas was made to mingle with the vapor by the aid of coils of iron wire; the combined vapors were then conveyed to the burner. This is, I believe, the first practical application which was made of the discovery of Lavoisier, and was so far improved on as to use charcoal as the substitute for iron in decomposing water.

From some defects in the mechanical arrangement of his apparatus, Mr. Donovan was never able to make his gas advance in public favor, and the opposition given by the underlings of the Trinity Board, which contracted for the supply of oil to all the light-houses on the English coast, prevented its adoption in those situations. To remedy these imperfections, Mr. Gilbert Sanders, the Manager of the Oil Gas Works, in Dublin, the most extensive of the kind in Great Britain, devised certain improvements, which he patented in March, 1835. His chief object was to convert all of the carbonic acid formed when steam is passed over red hot charcoal, into carbonic oxide; to effect this, he passed the steam in moderate quantity first on red hot charcoal, whereby he obtained hydrogen, light carburetted-hydrogen, carbonic oxide and carbonic acid gases; these combined gases he immediately transferred into another retort, containing red hot charcoal, whereby some of the carbonic acid first produced is de-oxidised and converted into carbonic oxide; a third retort, similarly heated, is used if any acid still remains undecomposed, and thus one of the great objections arising from the action of steam on charcoal, namely, the production of carbonic acid, a gas injurious to illumination, is overcome. The compound gases are finally delivered into the heated cylinders, where tar, turpentine and bitumen, were dropped at a temperature sufficient to produce permanent gases. The mixed gases were then passed into the condenser and ultimately into the gasometer.

This plan of converting carbonic acid into carbonic oxide, was a real improvement. The common mode of getting rid of the acid, was to wash the mixed gases, which entailed considerable loss in the amount of gas; but Sanders' mode, while it removed the acid, replaced it by carbonic oxide, a tolerable diluent, and a combustible which occupied double the space of the carbonic acid decomposed. Yet this did not render hydro-carbon gas capable of approaching coal-gas as a competitor; the uncertainty of uniformity in the products obtained were as great as in the case of coal-gas, and the slow rate at which steam is decomposed so as to avoid abundant production of carbonic acid, was ever an obstacle to its introduction. Sanders, himself, never introduced his patent into public use, and has entered on record his full avowal of the incapability of availing ourselves of this mode of illumination. Subsequent to this period, Jobard, in Belgium, patented a manufacture of hydro-carbon gas. He obtained his hydrogen by passing steam on incandescent coke in vertical retorts, and carburetting the gas in a separate retort. The plan of Selligue, practised since 1834, in France, and that patented by Val Marino, in England, do not essentially differ from that of Jobard. All of these undertakings, opening with brilliant prospects, have narrowed down in the course of a few years to what may be termed a small business; in a few localities they have sustained their reputation, but judged as to their success in the aggregate, they have in no degree realized the expectation of the originators or of interested capitalists. About seven years since the English public were *exercised greatly* by the process for manufacturing hydro-carbon gas, which was patented by Stephen White, and which consisted in decomposing water by dropping it on coke in a red hot retort, by which a mixture of steam, hydrogen-gas and carbonic oxide, are produced and thence transferred without delay into a second retort, containing a plate of iron, upon which, when highly heated, oil or tar is dropped, and thus a bi-carburetted hydrogen produced. The mechanical combination of these gases constitute the water-gas. In a second patent, taken out by White, he indicated pit-coal as a substitute for oil, for which he was prosecuted by Mr. James Young, as being an infringement of the patent of the latter, for producing paraffine oils from coal. White used narrow cylindrical boilers for the decomposition of the water, and a ⊓ shaped retort for distilling the boghead coal. When first put in operation, this process was deemed an advance in the manufacture of gas; a mania in its favor set in, coal-gas companies modified their works to suit its adoption, and new works were raised for its special manufacture. The South Metropolitan Gas-Works, London, tried it; so also the Southport (Eng.) Gas Co., and it was tried at Leith and Edinburgh, and with what success? Who now hears of a hydro-carbon gas company manufacturing in large cities? The mania has died out, and speculation has found a new channel wherein profits can be made. The Southport Gas Company clung longer to the fond idea of its practicability than any other, but ultimately abandoned it in April, 1854; then the London Gas Company; and the experiments in Scotland, not being satisfactory, the process was never applied on the large scale.

The history of the application of hydro-carbon gas being so far complete, although unsatisfactory in result, it may be worth while to consider what were the circumstances leading to failure, and judge thereby whether in its present *status* the manufacture contains within itself the seeds of its ruin.

A pure water-gas, fit for carburation, should consist of half hydrogen and half carbonic oxide. This is what would occur if a due temperature were always secured and if the materials were pure; but as in practice these conditions are never satisfied, the resultant gas is never pure or constant in the proportion of ingredients. For each volume of hydrogen generated by the decomposition of water in contact with carbon, there must be generated an equal volume of carbonic oxide, or in lieu of it, half a volume of carbonic acid. The production of carbonic acid depends upon the temperature; it is very readily formed, more prone to form than carbonic oxide, and it is always to be found to some extent in the decomposition of steam, replacing the carbonic oxide either partially or wholly. The experiments of Mr. Thomas G. Barlow, performed with wood charcoal, show the effect of temperature on the relative proportion of these two gases in the product. This gentleman estimates the most proper temperature of the retorts used for decomposing water, to be about 1,600°, when 870 cubic feet of gas were produced from three small retorts. During the first six hours of working, the composition was in 100 parts:

Carbonic acid....	15·50
Carbonic oxide....	25·75
Hydrogen.....	58·75
	—— 100

The retorts were kept in constant action for 24 hours, during the latter period of which, the carbonic acid increased so much, that the average of the whole 24 hours amounted to

Carbonic acid....	20
Carbonic oxide...	20
Hydrogen.....	60
	—— 100

At the outset the retorts were kept at 1,600°, but they soon fell down to 1,200°; when this happened, not only was the amount of carbonic acid augmented, but the total amount diminished from the quantity stated to 160 c. f. per hour; so that unless the temperature be kept elevated, there is an increase of carbonic acid and a total decrease of gas.

Theoretically, only 16 lbs. dry charcoal are required for 1,000 feet of gas, having the half-and-half constitution; but where much carbonic acid is produced by low temperature, the consumption of carbon is much greater, amounting in some cases to 26 lbs.. It may be that a high temperature at the outset, prevents the formation of carbonic acid, but it is more likely that it is first formed and then decomposed almost instantly by the highly heated retort and the incandescent charcoal present.

This, then, is the first difficulty of hydro-carbon gas; the excessive formation of carbonic acid, which wastes more carbon, diminishes the total production and vitiates the mixture. The separation of this gas, as by washing, removes a large per centage of the original gas, and if not removed it exerts a great effect in diminishing the brightness of the light. Mr. Lewis Thompson, Jr., has shown that *one per cent.* of carbonic acid left in coal gas, so diminishes its light as to require 111 measures of gas to produce an effect equal to 100 measures of purified gas. If 1 per cent. so deteriorates gas, what would 15 or 20 per cent. produce? The gas produced by the South London Co., in 1853, contained, *when purified*, from 5 to 5½ per cent. of carbonic acid.

When coke is used (as commonly) to decompose water it produces a gas yielding nearly the same constitution as that obtained from charcoal; but the quantity produced is much less, and *always* contains the impurity of sulphuretted hydrogen: as some coals contain more pyrites than others, so their cokes will yield more sulphur and form this disagreeable gas, which requires removal. This was a great complaint made by the consumers of the hydro-carbon gas in England, namely, its intolerable fœtidity from imperfect purification. It acts also on the light produced, similar to carbonic acid.

The three great impediments to success in the water-gas, may then be stated as:

1. Uncertainty in the total amount of gas produced.
2. Augmentation of production of carbonic acid.
3. Undue formation of sulphuretted hydrogen.

There must be an *uniform* temperature kept up, and that temperature must be high, else the steam will not be uniformly decomposed, nor the resulting gas have a normal constitution. Yet, in practice, it is found next to

impossible to prevent the retorts cooling down. By White's process, we have seen from 15 to 20 per cent. of carbonic acid produced; there was nothing in his process which rendered its formation excessive; it was due to the conditions of temperature, and may occur in any factory. To remove this, entails considerable loss of product. Gilbert Sanders' plan, as given, accomplishes this with gain to the total quantity of gas produced, but the proposer hesitates to recommend it, as not being economical. The sulphuretted-hydrogen appears to be produced at the close of the process, when the temperature of the retort is lowered. The gas of the South London Company, was loaded with it. Its removal entails loss in the product, and is expensive and never complete.

With boghead coal in retorts, charged every four hours, with 63 lbs. each change, White obtained 32,000 feet of total unpurified gas; as Boghead coal yields nearly 13,000 feet per ton, of gas, the difference is to be placed to the decomposition of water. The constitntion of his hydro-carbon gas, was:

Boghead Gas.....			2,560
Water-Gas, viz.—			
Carbonic acid....	371		
Carbonic oxide }	2,373		2,744
Hydrogen..... }			
Total.....			5,304 cubic feet.

The real question is simply this—can this 2,744 feet be produced cheaper by decomposition of water, rather than by the distillationof an additional quantity of coal? The past experience shows it cannot; that while the decomposition of steam is effected at a cheaper rate, the gas has (like coal-gas) also to be purified, and loses more by purification; and it has no residual products for sale, which diminish the cost of coal-gas. The cost of each appears to balance the other; where coals can be had cheaply. Hydro-carbon gas cannot compete; where coals are dear, it will succeed, *quoad* cost of production. But there is an uncertainty about the uniformity of decomposition which always harrasses the manufacturer; an uncertainty in the amount of dilution and consequent variation in its photometric value, which in the majority of cases stands in the way of its general use.

I have been led to make these extended remarks from reading a circular in the AMERICAN GAS-LIGHT JOURNAL, coming from the friends of the J. Milton Sanders' hydro-carbon gas. There appears to be nothing in his process which obviates the general objections, afforded by experience, of thisclass of gas. The assertion made in that publication, that the nascent hydrogen being generated in contact with the hydro-carbon, necessarily produces a higher carburetted gas, is a statemnt for which there is no foundation as yet supplied by experiment.

THOMAS ANTISELL.

WASHINGTON, D. C., April 10, 1860.

ON DECOMPOSITION OF OLEFIANT GAS, AND FORMATION OF GAS-CARBON.

The elementary proposition set forth by writers on the compounds of carbon is, that olefiant gas, when passed through a heated tube, is decomposed, a portion of its constituent carbon being deposited, and marsh gas and hydrogen gas remaining. Most of the observers agree in stating that the carbon is deposited as *charcoal* or *soot*. My own experiments prove this decomposition, more or less complete, to be *always* attended by the production of sooty carbon or lampblack; and in purified olefiant gas, the presence of metals in the heated time produces no change of effect in so far as the *kind* of carbon is concerned. From the first moment of decomposition to the last, when the gas has been passed and repassed through the hot tube, more or less obstructed by quartz, fire-brick, copper, iron, platinum, or anthracite, no other form of carbon has been observed. In the discussions of gas manufacturers in regard to "high" or "low" heats of retorts, the decomposition of rich gas in the higher temperature has been much insisted on as forming the basis of the argument against the employment of "high" heats; and it is always stated that the gas decomposed is increased in volume and diminished in value by the loss of its carbon element, more gas being obtained at the expense of illuminating power. The fact of this decomposition taking place at high temperatures, has thus been urged prominently into notice, without sufficiently attending to the circumstances under which the change of composition occurs; and in calling the attention of gas engineers to this point, it is my wish to put experimental results in the place of what appears to me to be rather supposition than reasonable demonstration.

When olefiant gas charged with such vapors as highly heated coal produces, is again heated in a tube, it is *not* decomposed so long as vapors are present: it passes and repasses in their presence the same surfaces which rapidly decompose the gas when heated in the same way, without the presence of the vapors. But a remarkable effect on such a mixture soon becomes evident in the coating of the surfaces by the carbon in its *allotropic state*, known as gas carbon. The change produced in this way is referable to the introduction of coal vapors only, every other circumstance remaining the same as when pure olefiant gas was decomposed, with the production of lamp-black coating the surfaces. Omitting the olefiant gas, the experimental demonstration becomes simpler when we pass the vapors of coal undergoing decomposition through a heated tube. The ordinary amount of olefiant gas, due to the coal production only, is now present, while the vapors are in excess. Rarely is any soot, or lamp-black a result of heating these products abounding in dense volatile hydrocarbons, the carbon separating slowly, has the allotropic state, while its one chemical structure is not only different also, but is instructive in reference to its origin.

The carbon deposited from the coal vapors, when highly heated, has the metallic lustre, hardness, density, and color of gas carbon; it has also a vasicular arrangement of its particles, showing that the body which produced it was in the form of vesicular vapor. Under the microscope, its particles appear as parts of hollow cells which had burst, and when placed by the side of the thin incrustation just commencing its formation on the more highly heated part of a coal-gas retort, the same texture and other physical characters offered themselves to view in both pieces. The thin, first-formed incrustation on a retort in constant use, always has the arrangement of broken vesicle walls aggregated, and it forms an interesting object when viewed under a low power of the instrument.

The deposition known as gas carbon is thus proved to be a product of decomposition of vapors proceeding from coal, and not a deposit formed in the removal of constituent carbon from olefiant gas, which gives up its carbon in the form of lamp-black only.

In connection with the subject of high or low heats, therefore, the greater production of gas carbon taking place in the higher temperature cannot correctly be attributed to the decomposition of olefiant gas by the heat, but is properly due to the change of composition which the vapors undergo when more highly heated.

More vapors would be produced in a given time, and they would be heavier in the higher heats than in the lower, and hence the well-known increase of incrustation which always follows the employment of the higher heat in gas retorts.

In the study of the production of this gas carbon, it soon becomes apparent that some coals cause a far more rapid and copious accumulation of it in their decomposition, than attends the breaking up of other coals in a similar manner. A general statement of my own results would connect the larger production with the use of coals rich in hydrocarbon. In the lowest temperatnre of coal decomposition, where little gas and much of fluid products are obtained, as in the manufacture of burning oils, we find such coals as the Albert, rich in hydrocarbons, coating the retorts with allotropic carbon. In some cases, it even appears that the vapors are so heavy in carbon constituent, that they deposit gas carbon as they rise to form oil instead of gas.

When a thick mass of gas carbon is examined, it appears close and dense, its general structure decidely prismatic, as if a rude crystallization had commenced. The evenness of its fracture, and its great solidity, convey to the mind a doubt of its having ever been a porous, cellular body. Taking the thin, external and brilliant coating *as the last formed part*, which is porous, a little dissection of the mass, aided by a lens, will show that the earliest deposition having had the same structure, has been rendered close by its pores having been filled with the successive deposits so as to close up all interstices, and render it to the eye homogeneous.

This allotropic state of carbon is produced when heavy vapors of hydrocarbon are decomposed under a variety of circumstances, and the substance itself is often very beautiful. Among the objects used in illustration by Dr. Faraday at the Royal Institution in London, is a wisp of straw and grain heads converted into gas carbon, rivalling polished steel in brilliancy and color, and yet preserving the most minute details of the organic structure unimpaired. As it occurs in gas retorts, it forms one of the many impediments in the way of economical production, and its removal, or the prevention of its formation engages the mind of every one daily watching the processes.

Its removal, in the way of partial combustion and the employment of some mechanical means, has been the general resource. A current of heated air passing to the point of greatest thickness, while the retort is also highly heated, burns and cracks the mass after some time. But the employment of steam, *under very moderate pressure*, superheated in a coil of red hot pipe, is a far more efficient plan, and is attended in its application by no risk of fracturing the retort.

Instead of a coil, a piece of four-inch cast iron pipe, filled with inch cubes of broken cast iron, having caps at both ends for attaching the leading and the eduction steam pipes, is a very serviceable heating chamber, and the steam at near the point of redness, so as to become decomposed by the cast iron after some hours use. A jet pipe, with a small opening, allows a fine stream to play upon a limited surface of the carbon, so as to cut channels in it, and soon to loosen its hold on the material of the retort.

The prevention of its formation is not probably under control, but a measurably smaller deposition may be insured, by attention given to two circumstances—

1st. Either by substituting for the shorter retort long retorts with two mouth-pieces, and then by securing for the amount of coal decomposed a more uniformly-heated surface of retort; or by watching the working of shorter retorts and correcting inequality of temperature in them as the deposit forms, at the hottest point above the coal.

2d. In the use of mixtures of coals, such as will produce in the proportions determined experimentally, the standard of gas required. The mixture being uniform, highly vaporous coals do not practically enter the retort, and hence less vapor being produced, less of deposit will form than would be the case if vapor producing coal were alone used.

So much extra fuel is required, and destruction of iron retorts is so rapidly hastened after gas carbon makes its appearance, that frequent inspection is called for, and a prompt removal of the substance should follow its discovery.

PLATINUM.

FLOW OF GAS THROUGH PIPES.

104 LEADENHALL STREET, London,
March 22, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

SIR.—Your February number contained a long article of "Observator" on the laws which regulate the transmission of gas through pipes, in which he gives the old rules to be found in Clegg's first edition, published nineteen years ago.

I waited your March number in hopes that some one would refer to the fallacy of those rules *only*; but as no one seems to have done so, I beg to state that, where the diameters of the pipes are varied, a further rule must be introduced. I have not time to go into this question now, but inclose to you some remarks of mine which appeared in the London Mechanics' Magazine upwards of ten years ago. I may also state that, at the time I made those remarks, I had my attention anxiously drawn to the subject. I was engaged preparing the plans for a metropolitan gas company here, which at that time was threatened, and afterwards had to undergo a severe parliamentary opposition. We had upwards of 2½ miles to send our gas from the manufactory to the point of supply. The maximum quantity required to be delivered during the heaviest hour was 170,000 feet; the cost of the main we *did* lay down was £10,000; but if we had taken the rules in Clegg's first edition, we must have laid down a pipe that would have cost upwards of £20,000.

The case was so serious that I wrote to Mr. Clegg, who was then alive, and he admitted the want which I pointed out in his formula, and in his second, as also in the new edition of his work recently published by his widow this matter is correctly stated. *No gas engineer or gas company should be without this book.** It is by far the most valuable treatise of the kind extant, and it contains much practical and statistical information, which it would take many thousand pounds to reproduce from the experimental sources from which it has been obtained.

* The latest edition of this work can be had at the Rooms of the AMERICAN GAS-LIGHT JOURNAL.

I have no wish to appear censorious, but many persons will see the AMERICAN GAS-LIGHT JOURNAL who will never see Clegg's work, and it is that young engineers may not be led to spend capital uselessly, as also that they may know where to obtain correct information, that I have thought it necessary to trouble you with these remarks.

GEORGE ANDERSON.

P. S.—The following example will illustrate the importance of the additional rule I apply. A 6-inch main, of a given length and pressure, is found to deliver per hour 4500 feet. A 12-inch main, having four times the area of a 6-inch main, is stated to deliver 4500 × 4=18,000 feet. I now multiply this result by the square root of 72, (the circumference of 4 of 6-inch mains) and divide by the square root of 36 (the circumference of one 12-inch main)and the result is 25,443 feet.

FLOW OF GAS THROUGH PIPES.

SIR,—In no department of gas engineering is there more need of experimental information than in that of the flow of gas through pipes, inasmuch as the results given us by rule do not agree with those found in practice.

I believe that the same inconsistency holds in regard to the flow of water and other fluids; but my experience being confined to gas, I will limit my observations to that branch of the subject.

I have read the best works upon the subject, and had the private opinions of the most eminent engineers, and, with one exception, I have been told that, for the difference of length, the discharge will be inversely as the square roots of the lengths, and that, for different diameters, the discharge will be directly as the squares of the diameters.

To take an instance: A pipe, six inches in diameter and 500 yards long, is found to deliver 3,636 cubic feet; whereas the same pipe, if extended to 1000 yards in length, will only deliver 2,666 cubic feet. This has been proved by experiment, and we will asume it to be correct.

But we are told that a pipe, 12 inches in diameter and 500 yards long, will deliver only 14,744 cubic feet; or, if extended to 1000 yards in length, its discharge will be reduced to 10,424 cubic feet. In both cases it will be observed that the amount said to be delivered by the 12-inch pipe is exactly four times that delivered by the 6-inch pipe, or as the square of the area; and here I disagree with those who have written before me.

In a calculation of this kind there are involved a great many intricacies; but I will pass over those minor considerations, such as the friction of the particles one against another, &c., which theory, perhaps, more than practice, would lay stress on, and merely advert to what appear to be the main causes requiring notice—namely, the gravitating power or inertia of the gas, and the surface against which it has to rub during transmission, these having to be overcome by the force or pressure employed.

Let us see then how this applies in the case before us. A pipe, 6 inches in diameter, is, in circumference, 18·8496 inches; and four such pipes equal in capacity to one 12-inch pipe, are in circumference 75·3984. Now, a pipe 12 inches in diameter is in circumference, 37·6992 inches, or just one-half; so that in one case we have double the rubbing surface which we have in the other. Under such circumstances, I pronounce it physically impossible that the discharge can be the same.

I am aware that some modern writers have remarked that there will be a slight advantage in favor of the larger pipe, from the cause I have just mentioned; but I contend that a passing notice of such an important point is not enough, inasmuch as large pipes, from 12 to 16 and 18 inches in diameter, will deliver from 40 to 70 and 80 per cent. more than the rule gives.

We have found that when the 6-inch pipe was 500 yards in length, it delivered 3686 cubic feet, and when extended to 1000 yards in length, its delivery was reduced to 2606 cubic feet. Now, in thus extending the pipe, what did we do? Why, increase the rubbing surface. We thus have a rule for calculating the effect of length friction, while side friction is entirely overlooked, just as if there was any important difference between the one and the other.

For the reasons above stated I have been led to add one additional rule, viz., *that the discharge will be inversely as the square root of the rubbing surface.* A 12-inch pipe, therefore, will deliver at 1000 yards length 14·731 cubic feet, an addition of 41 per cent. The difference appears more conspicuous in very large pipes; thus an 18-inch pipe is reckoned to deliver, at 1000 yards, 23,464 cubic feet, whereas, by my calculation, it will deliver 40,677 cubic feet.

As I am not able to say that I have proved this rule by experiments expressly made for the purpose; nevertheless, I am prepared to say that it agrees with my experience of the action of large pipes better than any other rule I can apply. I therefore throw it before your readers to receive their scrutiny, and shall be happy to hear of any rule that will answer existing objections better.

GEORGE ANDERSON.

LONDON, October 18, 1849.

ON COMBUSTION.

The process of combustion, on which both the manufacture and the use of gas depend, seems a very simple one. A small amount of chemical knowledge, however, is requisite to prove the process to be as marvelous and as difficult to understand as are many of those forms in the animal economy which have for ages baffled and allured the enquiries of physiologists. Previous to the discovery of oxygen gas by Priestly in 1771, and by Sceele, in 1775, the phenomena attending combustion were explained on a theory invented by Stahl, a celebrated European philospher, whose physiological opinions were, some of them, rather curious, especially those relative to the action of the mind on the material organism in which it resides. This theory, together with that by which he explained combustion, prevailed at one time extensively. Stahl thought that coal, wood, and all combustible substances, were composed in part of an elementary principle, called phlogiston. To this he supposed they owed their combustibility. When burned, their phlogiston was released, and they were combustible no longer. Thus a metallic oxide was regarded as a simple substance. The metal itself was regarded as a compound of the oxide with phlogiston. This seemed a very simple and very satisfactory explanation, and was long believed fairly to represent the ordinary phenomena of combustion. Like many other beautiful theories, satisfatory enough during an imperfect state of knowlege, it was destined to be subverted by the advancing steps of medical science. Lavoisier proved that a body undergoing combustion, so far from giving out anything, always acquires oxygen. Thus, on burning a piece of phosphorus, in oxygen, some of the gas disappeares, the phosphorus increasing in weight, the increase being precisely equal to the weight lost by the volume of gas.

What, then, is combustion? The young chemist is surprised to find that all substances while burning, invariably augment in weight, and increase exactly in proportion to the volume of oxygen which during the process disappears from the surrounding atmosphere. It may perhaps equally surprise him to learn that the union of a body with oxygen—which constitutes combustion—is substantially the same phenomenon as goes on every instant in the body, burning away nervous, muscular, and used up tissues, and employing them as fuel for the constant generation of heat enough to maintain throughout the whole system an elevated temperature. If a piece of iron be consumed in a furnace, the process is the same essentially as if the same piece of iron had been left to rust away in the atmosphere. The same amount of heat would be generated and the same amount of oxygen absorbed, the only difference being that the rapidity of action in the one case completes the process in a much shorter period of time.

If combustion of coal-gas and other substances consists in the energetic union of these substances with the oxygen of the air, attended with the evolution of light and heat, we may with propriety ask, how the attendant light and heat are produced. Lavoisier failed in his attempt to explain this. Latent heat was the principle he suggested, but this theory has been confuted by subsequent experiments. Some writers attribute these phenomena to chemical action; others, among whom was Berzelius, to electricity; but the true and complete explanation has not yet been sufficiently established. Still, according to the theory of Berzelius, which appears a very probable one, all artificial methods of illumination sustain a very important relation to electricity; and the light either of a taper, of a common gas burner, of the oil or spirit lamp, or of the oxy-hydrogen Drummond burners, might make a claim to the designation of electric. It is also worthy of remark, that not only do combustibles vary in the amount and color of the light emitted during combustion, but that the amount of heat is also subject to considerable diversities. We must not however be supposed to affirm that oxygen is the only gas capable of supporting combustion. Lavoisier stated that this was so, but undoubted experiments have since proved that chlorine, cyanogen, and other gases, are also capable of supporting combustion. In considering the combustion of coal-gas in ordinary burners, we have to regard its various relations during the process. Hence. as combustion is the cause of the light and heat evolved by burning gas, the more perfect the combustion the more intense will be the heat and light produced. And, as these depend upon the amount of oxygen taken up during combustion, too much care cannot be taken to select such burners as will most thoroughly mix the gas with atmospheric air at the instant of combustion. On this principle depend the economy and photometric value of several gas burners recently introduced in Europe and in this country, the ingenuity, elegance, and scientific construction of some of which, is extremely creditable to the inventors.

On the application of heat to bituminous coal, the first result is its absorption by the coal, and the disengagement of gas, from which flame is exclusively derivable. The constituents of this gas are, *hydrogen* and *carbon:* and the unions which alone concerns us here are, *carburetted hydrogen*, and *bi-carburetted hydrogen*, commonly called olefiant gas. *Combustibility* is not a quality of the combustible, *taken by itself.* It is, in the case now before us, the union of the *combustible* with *oxygen*, and which, for this reason, is called the "*supporter;*" neither of which, however, *when taken alone*, can be consumed. In ordinary language, a body is said to burn when its elements unite with the oxygen of the air, and form new products. One of the bodies, as hydrogen, is termed the burning or combustible body, and the oxygen is said to be the supporter of combustion; but this language, although convenient for common use, is incorrect as a scientific expression, for oxygen may be burned in a vessel of hydrogen, as well as hydrogen in a vessel of oxygen, the one and the other being equally active in the process, and being related to each other in every way alike. To effect combustion, then, we must have a *combustible* and and a *supporter* of combustion. Strictly speaking, combustion means *union*—but it means *chemical* union. Let us bear in mind that coal gas, whether generated in a retort or a furnace, is essentially the same. Again, that, strictly speaking, it is not inflammable; as, *by itself*, it can neither produce flame nor permit the continuance of flame in other bodies. A lighted taper introduced into a jar of carburetted hydrogen or coal-gas, so far from inflaming the gas, is itself instantly extinguished. Effective combustion, for practical purposes, is in truth, a question more as regards *the air* than the *gas*. Besides, we have no control over the gas, as to quantity, after having thrown the coal on the furnace, though we *can* exercise a control over that of the air, in all the essentials to perfect combustion. It is this which has done so much for the perfection of the *lamp*, and may be made equally available for the *furnace;* yet, strange to say, in an age when chemical science is so advanced, and in a matter so purely chemical, this is precisely what is least attended to in *practice*. The *how*, and the *when*, and the *where* this controlling influence over the admission and action of the air is to be exercised, are points demanding the most serious consideration, and can only be decided on *strict chemical principles.*

THE NEW HAVEN, CT., GAS CONTROVERSY.

On the 12th of March last, a letter signed by O. F. Winchester, P. S. Galpin, Arthur D. Osborne, F. W. Northrup, and J. M. Augur, a Committee appointed at a meeting of Tax-payers and Gas-consumers of that city, was addressed to the New Haven, Conn., Gas-Light Company, entering somewhat into detail about the Company's affairs which they consider rather too prosperous, and asking them the following questions:

1. Will you furnish consumers with good 24-candle-gas for $3 per 1,000 feet, commencing with the present quarter, with the customary deduction for prompt pay within five days?

2. Will you continue to light the public lamps as heretofore, and place in your works a good photometric apparatus for testing the quality of the gas, which apparatus shall be at any time open to the inspection and use of such agent or Committee as the Common Council may appoint?

3. Will you also take up during the coming season, such of your mains as are too small for the present daily consumption, and replace them with those of sufficient capacity, to effect a daily distribution of at least 150,000 feet without under an unusual pressure?

The Committee added, that if the Company acceded to those propositions, they would call a meeting of their constituents and recommend them for their approval, and wound up, by requesting an answer by the 20th.

On the 28th March, the Company by W. W. Boardman, President, replied in a letter of some length, correcting certain false impressions about the profits of the Company, which the Committee appeared to be laboring under, and stated what we know to be quite true, that 24-candle-gas cannot be furnished at less than $4 per 1,000 feet; it is a higher grade of gas we believe than is furnished in any other city in the Union. The grade in New-York is 17 candles; in England 10 candles.

Lord Lyons told us the other day in Washington, that he had been struck with the superior quality of our gas to the English, and he was about visiting New-York for the purpose of examining into the details of the gas-works here and the cause of the superior gas. Mr. Boardman proceeds to shew that instead of delivering 100,000 feet of gas per day, the average &c., delivery during the year 1859 was but 60,876 feet; that in the sparsely populated streets of New Haven, where every house almost is a country seat, there is but one consumer to 57 feet of mains; that no charge is made for meters, nor for keeping them in order; that the pressure at the works is rarely over three, never over four inches, and in the mains it is but two to two and a half inches, while in Boston, Mass., which are considered model works, it is from ten to eleven inches at the works, but in the mains from two to two and a half inches; and that the price paid for lighting the public lamps barely pays the first cost of the gas without covering the expense of lighting The President further intimates, the intention of the Company to reduce the price of gas from $3 50—the present price—to $3 per 1.000 feet, as soon as the improvements now in course of addition are completed.

We know something of the history of the New Haven Gas-Light Company, and feel safe in saying that the whole dividends earned and paid since its organization, including the stock dividends, amount to less than seven per cent. per annum. The works were built by contract, at a cost of $70,000 against $100,000 capital, leaving the balance as a working capital, while additions have been made as the works increased, until the capital is now $200,000. The works are in fine order, and the gas if not better than perhaps any other, may be too good for that market. We think $3 is high enough for gas made in any of the Atlantic cities, and if consumers think they are paying too dearly for the light at that, we do not see why it should not be diluted to meet their fancy, on the principle of the darkey clergyman who when criticised by his ebony constituents for the excessively thin quality of his sermons, replied, "My belubbed bredderen, 'pears like you dis-remember dat poor pay makes poor preach."

We are not sorry on the whole, to see the agitation in the gas-world, for it will remove certain false impressions about the cost and quality of the gas in various sections of the country, while it will set the Companies at work to adopt improvements in its manufacture, and secure greater economy in the general service.

Since writing the foregoing, we have seen a public recantation by Mr. Arthur D. Osborne, of his action in the matter, by which it would seem as if a little slight-of-hand had been practised to get signatures to the remonstrance. The whole party had better become stockholders in the present Gas-Light Company, and subscribe to the AMERICAN GAS-LIGHT JOURNAL. We will then take good care of them.

CORRESPONDENTS' COLUMN.

SAVANNAH, GEO., April 17, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

DEAR SIR:—In abandoning the active pursuits of a profession which for nearly eight years has been my special and constant study, I feel a natural solicitude that my motives should suffer no misconstruction. With this view, I hand you a certificate of an Elect on held by the Stockholders of the Savannah Gas-Light Company, at their annual meeting on yesterday. My election to the vacant Directorship embraces a more tangible proof of esteem than any other I could receive, but I have also been honored with a most complimentary testimonial letter addressed to me by the old Board. I trust these facts will prove to my friends, that I have been in some degree successful, in my endeavor to prove myself worthy of their regard. Your obedient servant,

JAMES R. SMEDBERG.

SAVANNAH, GEO., GAS-LIGHT CO., April 16, 1860.

ELECTION.—At an election held yesterday at the office of the Savannah Gas-Light Co., for Directors to serve for the ensuing year, the following gentlemen were elected:

F. T. Willis, *President;* Andrew Low, Jacob Waldburg. Jno. C. Nicoll, Edward Padelford, Sr., Charles Green, Francis Sorrel, Geo. W. Anderson, J. R. Smedberg.

THE CONGRESS OF GAS OFFICERS.

CINCINNATI, O., April 10, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

The proposition made in the last number of the JOURNAL, by Mr. Samuel R. Brick, meets my hearty concurrence, and there is no doubt that a full representation of those interested, will be present. I do not agree with Mr. Brick, however, in excluding officers of what may be termed "Opposition Gas Light Companies." There is no telling how soon Mr. Brick himself, or I, or any other gas-engineer may be attached to what is termed an "Opposition Company," and by the operation of his plan the instrument of torture may be applied first to the inventor, as was the case of old.

Besides, if I remember aright, Mr. Brick was the originator of the opposition Gas Company in Charleston, S. C., to which you allude. No! If we are to have a Congress, let all be admitted, regular and volunteers, and let us all circulate freely, and without question as to minor matters. Let the spirit be freedom, and the watchword PROGRESS.

CHICAGO, ILL., April 13, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

I was a little amused at the exception proposed by Mr. Brick, in organizing the material of the Congress of Gas Officers, for October next. On his principle I am an outsider, travelling for pleasure and profit, ready for a job from a "straight" or "X" gas company; but I am an Engineer, and as such, shall be on hand and claim a seat.

X X.

LEGISLATIVE RASCALITY.

——, GAS-WORKS, ENGLAND, April 1, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

From your account of the attack which has been made on the Louisville, Ky., Gas Co., I find that American and English municipal bodies are much of a kind.

Gentlemen do not hesitate to be guilty of meanness in their corporate, which they would scorn in their private capacity, so much is this the case that no gas Co. is safe here which does not derive its powers direct from the legislature.

In establishing gas-works the custom has generally been to receive liberty from the town councils to break up the streets for the purpose of laying the mains, and for this liberty they have usually asked the Gas Co. to light the street lamps at about one-half the price charged to the private consumer, just as if the investment of money and the introduction of gas was not sufficient to compensate for any inconvenience suffered by the breaking up of the streets.

In later times these councils have given similar liberty to various companies, so that three and even four distinct sets of gas mains exist in some towns, and that in each new introduction they have played off one Company against the other and cheapened the price of lighting. On the other hand the companies have occasionally amalgamated and so the game has been played out, but of late years Gas Companies have gone to Parliament and so obtained powers over the streets, independent of the local authorities, and this is what your Companies must also do if you would render your property safe. It would not be amiss if you were to publish our "Gas-Works clauses Act 1847," by which Parliamentary Gas Companies in this country are regulated.

We wish our correspondent would send us the copy of the clause in the Act referred to. We do not think it is to be found in this country.—ED.

ROSIN GAS.

——, GAS-WORKS, L. I., 10th April, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

I am in search of information as to the most improved plan of making gas from rosin, and am also desirous of learning what discoveries, if any, have been made in this particular branch of gas-manufacture. Within the past few years I have looked through all the scientific works within my reach, hoping to glean some useful hints on the subject, but thus far without success. Permit me, therefore, through your columns to ask the attention of such of your readers as may take an interest in the subject, trusting that some one of them may feel disposed to supply a want that, as a manufacturer, I have long felt.

Perhaps you may be able to inform me how many cubic feet of gas a pound of rosin should yield; whether rosin-gas, once manufactured, is more subject to condensation than coal-gas? and if so, what is the relative difference?

Please enlighten me on these points, and oblige

Yours very truly,

* * * Superintendent.

We beg to call the attention of our readers to the above letter. We hope its publication will elicit some valuable practical communications, which shall be published a received. Our correspondent will find much important information in "Muspratt's Chemistry as applied to Arts and Manufactures." In the 4th division of this work will be found some remarks on Rosin Gas. We extract one paragraph, which will constitute an answer to most of Superintendent's queries.

"He (Dr. Fyfe) considers therefore, that the quantity "of gas that can be produced from rosin, in practice, will "not exceed eight or nine cubic feet per pound—that is, "about one thousand cubic feet per hundredweight: "that the gas, after being purified, will be of specific "gravity not much beyond six hundred; the condensation "by chlorine not much beyond eight or nine per cent., a "cubic foot of gas not giving more than the light of "from two and a half to three candles"

In the same article the author states that, according to the statements of Ronalds and Richardson, one of the best apparatus for making rosin gas, and which has stood the test of practice, is that which has been extensively carried out by Chaussenot. A description of the method of manufacture is given by Dr. Muspratt.—ED.

NEW BRUNSWICK, N. J., GAS-LIGHT CO., April 17, 1860.

* * * * * *

While on this subject, let me bear testimony to the practical value and excellence in every point of view of the series of articles on the PRACTICAL MANAGEMENT OF GAS-WORKS, commenced in the AMERICAN GAS-LIGHT JOURNAL by the able Engineer of the Manhattan Gas-Light Company.* They comprise just what is wanted by nine tenths of your most earnest readers—superintendents young in practice, if not in years—the elementary course preparatory to the comprehension of the more scientific knowledge of our profession. I go heart and hand with Mr. Brick for the Gas Engineers' Congress, only let it commence in the middle of the month, so that quarter-day may not interfere with the attendance.

Very truly yours,

JOHN G. HALL.

WATER WORKS WANTED.

——, CT., April 25, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

We have no water-works here at present, but hope to have them this season. It is very desirable that all the water Companies should give you full particulars of their affairs, and besides stating their population, revenue, and expense, tell us which is the best material for mains and service pipes, whether iron, cement and iron, or the vitrified clay pipe, also which is the best kind of stop cocks and hydrants. You will confer a great benefit upon many towns that are in immediate want of water as well as upon manufacturers, by securing a full reply to these questions, and giving us a full account of their operations to which end the Companies should and doubtless, will give you full and prompt responses.

Yours truly.

* * *

A GAS PHILOSOPHER IN PHILADELPHIA.

The oppressed public in Philadelphia have a brilliant champion in an anonymous contributor to the *Sunday Dispatch*. We have kept up with his articles from time to time, but for the life of us cannot see what he is driving at. Here is a specimen of his argument:

To the Editors of the Sunday Dispatch:

I promised you that after I had exposed matters in regard to the public lamps, and shown the manner the city and tax-payers had been charged extortionate prices, I would take up and discuss, and if possible explain to private consumers of gas why and how it is th t their gas bills are so much higher at the present time than when they paid three dollars and fifty cents per thousand feet for gas To those who are acquainted with that branch of mechanical science, a knowledge of which is necessary for manufacturers of gas, it is plain; they can see and know all of the workings of the present system; but those who are unacquainted with that branch of business are ever ready to attach the cause to the meter, or to men employed to take the state of meters, who are guilty of blunders, &c. I have no doubt that such blunders have been and will be made as long as meters are used. If that was the only cause there would be no difficulty in satisfying the consumers of gas that all would be made right. I stated in a former communication that the meter would indicate correctly the amount of gas passed through it, and keep as good time as any good watch Any one who fully understands the mechanical construction of the gas meter (whether it be wet or dry) will never doubt its correctness, although consumers bills may be doubled. It is said that the wet meter can be made to vary five per cent. above and five per cent. below the water line—that is, it would either be fast or slow in registering. Any change varying from the above would stop the flow of gas, unless the meter was defective, in that case the gas would continue to flow without registering, which is often the case. But the managers, ever on the alert, generally *smell* that out very soon. With the dry meter there can be no tampering, either by the consumer or any one connected with the works, as no water is used to raise or lower the water line.

Messrs. Editors, I have now stated what the gas meter is, and what it can be made to do. Poor little tell-tale! it has but few friends, and has to father all faults of the *manufacturing* and *distributive departments* of the gas-works. If some one would construct a meter to talk, it would, I have no doubt, tell some curious tales. For instance, it would tell you when the managers *wanted* to make too much out of the coal, and when they had a *bad lot or second quality of coals* on hand by *special order*. It would tell you when the hydro-carbons had been destroyed in the retort, and carbonic oxide, carbonic acid gas, and light carburets, had been produced in place of rich illuminating gases. It would tell you when any derangement had taken place at the fountain head in the way of foolish experiments. Last and not least, it would, if it could speak, advise you when the managers were crowding on an *excessive pressure* in order to raise a sufficient amount of money to pay the *interest* on capital foolishly, wickedly and wantonly expended in the way of building works in advance of time or the wants of the community and any other blunders which those having charge might make. I will at my leisure discuss all the points above named.

ESSEX.

The Widow Bedott had a horror of the sort of mind possessed by the "lordly Essex"—*vagarious*, as she would call it. "When a body begins to tell a thing," said the widow, "I believe in finishin' on it sometime or other. Some folks have a way of talkin' raound and raound and raound for ever more, and never comin' to the pint. Now, there's Miss Jinkins, she that was Poll Bingham afore she was married, she is the tejusest individoal to tell a story I ever seed in all my born days." The widow was a philosopher, but, from all appearances, Essex is anything but ditto.

PRIVATE GAS-PIPES vs. PUBLIC GAS-PIPES.

In the Court of Queen's Bench, in the suit of the Queen (on the prosecution of the Stoke-Fenton and Longton Gas Company) vs. the Longton Gas Company (limited) and others, indicted for opening the streets to lay their mains, Lord Chief Justice COCKBURN ruled, that although mains and service-pipes may be lawfully laid for the supply of gas to the public lamps, yet the breaking up of footpaths to lay mains for private companies, even if permitted by the public authorities, the owners and occupants of houses, the lord of the manor, and every other authority short of Parliament, is unlawful and indictable. His lordship goes on to say, that while the temporary use of a coal-slide in the pavement may be lawful, yet the sawing of wood in the public street is indictable. Would that mi-lord might walk the streets of this blessed metropolis on any day of the year! How his indictments would lie upon mounds of dirt, cords of wood, tons of coal, pyramids of brick, huge puddings of mortar, Corinthian columns of barbers' poles, and every other imaginable obstruction in the category of boxes, casks, dilapidated vehicles, old stoves, candy stands, apple-carts, and last but not least, lazy policemen.

* Our correspondent is mistaken as to the authorship of the articles on the Practical Management of Gas-Works. They are from the pen of a gentleman whose permission we must await before divulging his name, these gas engineers are so unaffectedly modest and retiring.

BOSTON KEROSENE OIL CO.—This Company of which SAMUEL DOWNER, Esq., of Boston, was sole proprietor, up to the first day of April last, has recently been reorganised as a Joint Stock Company. Mr. Downer still retaining an interest and directing its affairs as President. The Company will hereafter be known as the "Downer Kerosene Oil Co."

BLEACHING OF PARAFFINE.—A new Company is about being organized for the Bleaching of Parafine, and manufacture of Paraffine candles. It is not as yet determined whether the site of the works will be in this city or at New Bedford, Mass.

A whaling port would seem to be the last place to look for an establishment of this sort. But "Time works wonders."

TERRIFIC GAS EXPLOSION IN CINCINNATI.—A terrible explosion took place on Sunday evening, March 18th, about 7 o'clock, occasioned by the combustion of gas. Mr. F. W. Lohouse, whose place of business is at No. 84 Main Street, and whose family occupied the story above his store, having been absent during the day, returned home in the evening with his family. Leaving them on the sidewalk below, he proceeded up stairs from the street entrance, for the purpose, as is supposed, of striking a light. On opening the door of the room, he was sensible of a very strong smell of gas, and thoughtlessly ignited a match, when an explosion immediately followed, the effects of which were terrific. Windows, furniture, &c., were strewn in fragments into the street and about the premises. Mr. Lohouse was prostrated, but was not so seriously injured but that he was able to reach the street. His injuries were mostly confined to his head and face—his hair being burned off and his face blackened as from the effects of gunpowder.

The store of Messrs. Knapp and Ayers, distillers, next door, suffered severely from the effects of the explosion—the windows being demolished and several casks of liquor burst by the concussion. Several windows were also broken in one or two stores opposite.

SALE OF THE WORKS OF THE NORTH AMERICAN KEROSENE GAS-LIGHT CO.

On the last page will be found the Receiver's advertisement of the public sale of these works on 10th May next. In a report dated April 20, 1860, of the actual experiments by the Superintendents and Chemists, the Receiver says:

Two hundred tons of Scotch Boghead coal were accurately weighed, and put in the retorts or pipes, and the oil, when finished, was carefully measured, and the following is the result:

Illuminating oil, - - -	12,032 50-100 gals.
Heavy finished oil, - -	1,239 93-100 "
Paraffine, - - - - -	3,133 lbs.

Each ton of coal produced 60⅛ gallons of illuminating oil, 6⅛ gallons of heavy finished oil, and 15⅔ pounds of crude paraffine.

All the expenses in making these oils, except the cost of the coal, wear and tear of machinery, and interest on cost of works, amounts to $2,237 82, making the expense of manufacturing each gallon of illuminating oil 18 3-5 cents (calling the heavy oil nothing).

I found that, although practicable, yet it was not profitable to break up the heavy oil into illuminating oil, and that the most advisable course in making these oils is, after obtaining the largest quantity of illuminating oil consistent with economy, to press the paraffine out of the residue, which is heavy oil, and then mix this heavy oil with other substances, and sell it as a lubricator.

I have caused this to be done on a portion of this heavy oil, and made a lubricating oil, which, at the price of fifty cents per gallon (which is lower than any lubricator in market), will add greatly to the profits, as the whole expense of making these oils being charged to the illuminating oil, whatever is obtained by the sale of the heavy oil and paraffine is all profit.

The following table shows the cost of producing this oil from coal at different prices:

Coal at $10 per ton, - - -	35 1-5 cents.
" " 11 " - - -	36 4-5 "
" " 12 " - - -	38 1-2 "
" " 13 " - - -	40 1-5 "
" " 14 " - - -	41 4-5 "
" " 15 " - - -	43 1-2 "

Annexed to this statement is an affidavit of the Superintendent, Assistant-Superintendent, and Chemist of the Company, verifying its correctness,

PRACTICAL MANAGEMENT OF GAS-WORKS.

[*Continued from Page* 201 *of the* AMERICAN GAS-LIGHT JOURNAL.]

The mouth-pieces should be as light as possible, certainly not over 250 lbs. each, (whether for threes or fives) and may with great propriety have one or more "claws," of two inches clear projection from the flanch, by which its weight shall be suspended from the solid portion of the retort shoulder, and not from the bolts. These claws should not be over the slots which receive the bolts.

The malleable-iron lids, made under the Floyd patent at the Oregon Foundry, New York city, are justly considered as indispensable in a well-ordered gas-work. They weigh, for a 20 × 12 inch retort, only about 30 lbs. each, while the ponderous cast-iron lids formerly in use weighed 50, 60, or even, as in one notable instance, 84 lbs. apiece. If any of my readers be incredulous as to this last enormity of weight, I would refer them to the very interesting report of the Superintendent of the Richmond, Va., Gas-Works, for the year ending

Superadded to the advantage of lightness, other and not less powerful arguments exist in favor of the malleable-iron lids. In the process of annealing, they acquire a toughness nearly as great as that of wrought iron, while their original stiffness is little, if at all, impaired. Hence their durability is far greater than those made of the old material; and, except from an occasional snapping off of the projecting handles, there is hardly a limit to their period of service. And if a handle does break, a few rivets and a little labor in the blacksmith shop serve to replace it.

In working clay retorts, a feature is observable, whose legitimate tendency is to necessitate stand-pipes of larger calibre than when using iron. I refer to the rapid accumulation of the naptha compounds in the stand-pipe, which annoyance is unquestionably due to the intense heat applied to clay retorts, and to the constant rapidity with which the gas is evolved. These causes react upon each other to choke the stand-pipe as well as the mouthpiece orifice and for some distance above it; and as a primary means of obviating them, I would suggest the adoption of a stand-pipe of six inches internal diameter. It has been mentioned that the "Continental Gas Company," owning several gas-works upon the continent of Europe, have successfully adopted, as a means of preventing this trouble, minute jets of water over each of the stand-pipes, so graduated as to permit the complete evaporation of the water, as it trickles down, before it reaches the mouthpiece, which it would otherwise crack. If the statement be true, it does away with anything like necessarily enlarged pipes from this cause, and it is to be regretted that so simple a device has never, to my knowledge, been tried by an American engineer.

Independent, however, of the stoppage of the stand-pipes, another consideration, especially in the absence of an exhauster, calls for an enlargement of their conducting capacity, and that consideration is the rapid formation of carbonaceous deposits, due to the back pressure of an obstructed flow. High temperatures and pressures accelerate the formation of carbon; and as in the use of clay retorts the former influence is constant, and the clay itself very receptive of the hydro-carbons, no means should be ignored which neutralize or diminish the pressure upon the retorts.

It is necessary to the successful heating of clay retorts that the bridge-pipe joints should not be made until the retorts begin to show a dull red—a remark of whose truth many, perhaps, of my readers, have like myself, had sad practical proof.

In the whole treatment of clay retorts, no stage demands such care as that of their heating. From an ignorance of this fact has arisen, I am persuaded, more dissatisfaction with clay retorts than from all other causes combined. The fire must be slow, uniform and continuous, the dampers and ash-pits being closed during the first few days, and the increase of draft being exceedingly gradual, and cautiously admitted. In this way the retort can be treated, until it begins to show a dull red by daylight, and here, where I, in common with others, thought the danger at an end, the real danger actually begins. And here must be submitted a confession, which, whether it injures me or not, is due to my own ideas of candor and truth, and therefore inevitable. *I have never heated a bench of clay retorts without cracking one or more of the retorts it contained.* Others may have been more able or more fortunate; but there is a personal fact, and not a very pleasant one. This very liability to cracking but renders more imperative the utmost care in heating, for it is very certain that this liability is measureably controllable. If the inside of the retort changes its color *nearly* as rapidly as the outside, the gas-maker is pretty apt, under any circumstances, to escape with such trivial cracks as will speedily fill up with carbon; if the retort be not thus gradually heated, he may perchance find unsuspected pieces dropping out after a fashion that will disturb his temper, to say the least.

One thing is very certain—the thinner the retort, the less is the danger of cracking by unequal heating. Another thing is very uncertain—whether such a clay or combination of clays, is possible as shall possess high (*comparatively*) conducting or transmitting power, joined to small contractility and improved powers of resistance to heat. Has the thing been done, and if not, *can* it be done? What say you, chemists and retort-makers?

The first, and perhaps the best piece of advice which the gas-maker can follow, if his retorts do crack in spite of him, is to "take it coolly." "Nil desperandum," and a host of similar hope-recuperatives, hackneyed though they be, will suggest themselves as emollients of his solitary broodings. Let him be jocose instead of despondent, and full of retort comical as well as of retort alumino-gaseous, remembering that he has plucked a rose, and so met its proverbial accompaniment.

If a fortnight of as heavy charges as his heats will bear do not effect a sensible improvement, or entire closure of his cracked retorts, he may consider the case a desperate one, but not *until* then.

The engineer of the Manhattan Gas-Works, in a letter previously quoted, uses the following language in regard to the occurrence of cracks in clay retorts:

"I have not found the leakage of gas through the use "of clay retorts to be a serious objection, as it occurs "mainly after the removal of the carbon. The application of fire-clay to the interior fissures will render the "retort sound and gas-tight. I have, indeed, used a re-"tort which had been broken transversely through the "centre; and after having joined the two pieces together "with fire-clay, it proved as serviceable as others that "were originally perfect. As a precautionary measure "I have, when charging the retort for the first time, "saturated the coal with tar, repeating the operation "after each removal of the carbon. Slight leaks in this "way may be effectually closed.

"For the larger cracks a mixture of five parts of fire-"clay, one of borax, (fused and finely ground), and two "of fine white sand, may be used advantageously instead "of the simple clay."

Upon this last point it may be observed, that the ordinary cement, composed of fire-clay and borings, also answers an excellent purpose for stopping the larger cracks.

The liability to cracking, which occurs in the use of most, if not all, clay retorts, will upon a careful analysis, seem a less radical defect than would appear at the first blush; and at the worst is one which is more than compensated by the remarkably favorable results due to a clay retort when in its prime. The defect has been exaggerated very foolishly by the ultra advocates of iron retorts, and its very existence as foolishly denied by the over-enthusiastic partisans of clay; and the conflicting statements *pro* and *con* must alike be taken *cum grano salis*, until a more extended experience shall have given greater clearness to the sober outines of truth.

After the clay retort is heated, its treatment is very similar to that of irons, except as regards the removal of carbon. This removal has been variously effected in various localities, the most general plan being the promotion of a current of air through the Retort by means of a pipe of 4 inches diameter and 4 feet long introduced through an old lid. This, even with its useful adjunct, a chisel bar, is a tedious device, little carbon being scaled off unless the retort is left open from 18 to 24 hours. The air-blast is better and has been extensively and successfully employed in the works of some of the larger English companies. Various modes of applying steam have been recommended, some good, seme indifferent, some bad; and yet, after all, the most obvious and efficient means for preventing the large deposits of carbon are little known and seldom practised among American engineers. MR. PRATT, of the St. Louis Gas-Works uses a steel scraper after every charge, and his experience, subsequently verified by my own is that the carbon can in this way be kept down to such a mere film as neither to be appreciable to the eye nor any practical obstacle in charging the retort. Knowing the plan to be original with Mr. PRATT, I had until quite recently considered it as unique also; but am informed by Mr. JOHN A. COWEN, of Blaydon Burn, England, that a substantially similar method is quite generally practiced among Scotch engineers. By this plan, not a single hour of retort-service is ever lost, an argument which in itself is sufficient to establish the superiority of the scraper over all other methods, and most particularly over the primitive and tedious scurf-pipe.

In many works may be seen a thick tarry deposit upon the interior of the mouth-pieces, which deposit in extreme instances so far chokes the throat of the retort as very seriously to obstruct the process of charging. Unless this be removed as fast as formed, and never suffered to become of noticeable thickness, it soon gains a metallic hardness and intimate cohesion such as no man can attack in the face of a white heat. Even where the practice is to remove it every day, I have seen men suffer considerably from the heat while using the clinkering bars, and can easily conceive how and why a gang of stokers will permit this accretion to form and accumulate, unless closely watched.

We now have to consider what to the tyro in gas-matters would seem the very simplest and least important part of the gas-maker's education: I refer to the firing a bench in full action.

Many a beginner has found his heat run down without such change in the hygrometric condition of the atmosphere as to call for a change in his dampers; and without the practice of that besetting sin of the beginner, over-charging his heats. To what then is his trouble attributable? Generally, it may be answered, to improper and unequal firing.

The purpose of the ashpan is generally represented as being the cooling of the fire-bars, and their consequent preservation, by the evaporation of the water which it contains. Now it is very true that this is *one* function of the ashpan, but it performs another at least as important.

The water being evaporated by the heat which is radiated downward, its vapor is carried up through the incandescent mass of fuel, and so decomposed.

The resulting hydrogen and oxygen combine variously with the carbon of the fuel to form new orific gases by the combustion of which, as shown by the experiments of BUNSEN and FYFE, a marked excess of heat is gained over that lost in the decomposition of the vapor.

With improper firing, or an ashpit of insufficient size, this advantage cannot co-exist.

It is too often the practice to crowd the furnace full of coke, a practice which is usually traceable to the ignorance or prejudices of the stoker, but which is as repugnant to the true conditions of combustion as can possibly be conceived.

The stoker will tell you that the frequent opening of the furnace door chills his heats, and that a large mass of fuel gives off more heat than a thin stratum. The former remark is to some extent true, for the opening of the furnace door does, *momentarily*, so operate: while the latter position is true, just so far as a thick fire is better than no fire at all. But "*in medio tutissimus ibis*," and the true line of practice is to keep the fire of such a thickness as completely and with useful effect to strip the oxygen from the inflowing air. "Thin fires, frequent firing, and a large surface of combustion" is the motto; and it may be asserted that for one who errs by carrying this principle to its extreme, a dozen err in not observing it at all.

And while upon this topic, a word may be said upon the use of the ponderous clinkering bar. It was, and, to some extent, still is, the practice to employ a heavy bar of 1¼ inch iron entirely for freeing the grate of the accumulating clinker.

And even now this bar is usefully employed for breaking up the mass of clinker longitudinally through the center of the furnace: but for slicing the clinker clear of the brick, no violent measures are advisable, and for this purpose a light iron bar with an edged hook and heel at its end is most appropriate. Its adoption preserves the furnace to an extent not easily believed by those who have never tried it.

And here, with some diffidence, I assume a position which my own experience and observation go to support, but which I do not remember having seen stated elsewhere, that, *ceteris paribus*, the *strongest coke gives the strongest clinker*. My own explanation of this fact, if fact it be, is that the more intense heat serves to agglutinate and vitrify much of the *débris* of the coke which would otherwise pass through the bars in the form of an impure ash.

Does the experience of others tally with my own, or am I in error? Which ever be the case, the question ought to be set at rest by a discussion among American engineers through the columns of the AMERICAN GAS-LIGHT JOURNAL.

COAL TRADE OF THE LAKES.

The Lake markets are supplied with the anthracite and bituminous coals. The Anthracite is obtained from coal fields in the Schuylkill, Lehigh, and Lackawanna regions, Pennsylvania. Large quantities are brought to the Hudson river by the Delaware and Hudson canal, and much greater supplies are conveyed from Philadelphia, by sea, to New York. It is brought up the Hudson to Albany. The Erie, Champlain, and Oswego canals are the channels through which this description of coal reaches the Lake country. The state permits coal to pass through the canal at a rate of toll of one half mill per 1000 lbs. per mile. In this market, this kind of coal can be furnished for $7 per ton. It is used by our iron-makers for casting purposes. Bituminous coal, of which large quantities reach the lakes, is obtained from several sources in different states. This coal is made use of here for smithing and fuel; and is sold at $6 a ton. The quantity of Anthracite and Blossburg coal delivered at Buffalo, by the Erie canal, in 1849, was 13,367,595 pounds [5967 tons], and at Oswego, 6,608,422 pounds, or 2950 tons.

Large quantities of bituminous coal are obtained from coal-fields in the north-western part of Pennsylvania, 60 to 80 miles south of Lake Erie. This coal is of a very superior quality, and is extensively used by boats and other machinery driven by steam, as well as for smithing and domestic purposes of fuel. Very large supplies reach Erie from the beds. Bituminous coal is also freely obtained in Ohio, from beds lying along the line of the Ohio canal, and eastward from the Lake 50 to 80 miles. This coal is also of a very superior character, and is preferred by many to the Erie coal. Like the Erie coal it is principally used for steam and fuel, and also for smithwork. Neither of these coals are as highly bituminous as the Blossburg. In 1849, 1,910,474 bushels were received at Cleveland. It is sold at the same rate as at Erie, from $2 50 to $3 per ton. Erie and Cleveland coal is worth in Buffalo, $4 per ton. From these two places, Erie and Cleveland, large shipments are made to different points around the Lakes, on both sides. It is freighted at cheap rates, by vessels which fill up their cargoes with this description of loading. Canadian ports are largely supplied from these places with this article. In 1848, the shipment of coal from Cleveland to American and Canadian ports, was 131,200 tons. Another source of supply of bituminous coals, is from beds lying on the line of the Michigan and Illinois canal, in Illinois, distant from Chicago, on Lake Michigan, 6 to 80 miles. This canal was opened in 1848, and but little coal came to market that year. In 1849, 5,150 tons reached Chicago. The upper part of these beds furnish coal highly charged with sulphur, which confines the use of it principally for household purposes. Boats and other machinery make but little use of it for steam, it being so destructive to grate-bars and boilers. But the quality of the coal is improving the deeper the beds are worked, and the prospect is that coal of equal quality will soon be raised from them, as free from this objectionable matter as the Cleveland and Erie. The production of these mines is not definitively known, but a writer in the Cleveland *Herald*, estimates the entire consumption of coal by the Lake region in 1853, at 300,000 tons.

BITUMINOUS COAL OF CANNELTON.

Full details have been published from several parties, in reference to the cannel coal of this locality. It is situated in that part of the coal field which is intersected by the Ohio river, at about 120 miles below Louisville by water, but scarcely more than half that distance in a straight line. The seam varies from three to four feet in thickness and occasionally expands nearly to five feet. It is entered, for the purpose of mining, by means of an adit-level, a quarter of a mile from the Ohio, at an elevation of seventy feet above the bank of that river. In regard to geographical position, therefore, the site is an usually advantageous, and the coal can be furnished at a corresponding low price.

The coal, for an inch or two of the upper part of the seam, contains less bitumen than the rest, bearing a slight resemblance to cannel coal, and decrepitating when burning. Two or three inches of the lower part consists of a highly bituminous shale. The remainder of the mass is of the finest quality, coming out in large blocks of a foot or eighteen inches in diameter, exhibiting vegetable traces. It burns freely, yields a pleasant flame, and affords a light sufficiently strong to enable a person to read by it.

This coal was experimented upon by Prof. W. R. Johnson, and the results are detailed in his invaluable report to the Navy Department of the United States in 1844. He observes that the fracture is often conchoidal, and the lustre dull, like that of Scotch cannel coal. The surfaces are frequently covered with films of sulphuret of iron. Specific gravity was 1,247 and 1.297, the mean of which gives 79½ lbs. per cubic foot. The mean result of two specimens gave the following proportions:

Of fixed carbon, . . .	59.40	
Moisture and other volatile matter,	34.90	100
Earthy matter, (3.49 to 8.16) .	5.70	

Samples of the coal have contained a much smaller amount of earthy matter—in one case not much exceeding 2 per cent.

The observations of Prof. Johnson agreed with our own experience:—"From its flaky texture it speedily disintegrates into flat masses, burning with little intumescence, and scarcely any tendency to agglutination. This property allows a free passage to the air, favors rapid combustion, and causes the exhibition of an exceedingly brilliant light. Its prompt and rapid action appears to adapt it, in a remarkable manner, to the purposes of western steamboats. It seems to bear transportation better than any other sample of bituminous coal which came under notice. It was the only really available sample forwarded for trial from the great coal fields of the west."

It is stated by some of the proprietors of this coal, that the specimens sent to Washington were intended to represent a perfect cross section of the seam of coal, including the inferior portions. Had the combustible experimented upon consisted solely of the better and main portion of the vein, they conceive that the result of the investigation would have probably been yet more favorable.

This field occurs, like most others, in the basin form: the bed of the cannel coal at this place being the lowest in the series, which consists of two workable beds only, as we learn from a pamphlet recently published. The lowest coal, as we have stated, occurs at Cannelton and at Trade Water, in Kentucky; the upper seam is worked at Bon Harbor, and at various other places. At different points each of these seams varies from three to ten feet in thickness. The same bed of cannel appears also in Kentucky, Illinois and Missouri.

GAS-WORKS IN VALPARAISO.

The *London Journal of Gas-Lighting*, publishes the following letter:

This establishment was erected in 1856, and gas was first supplied on the 18th of September of that year—the anniversary of Chilian independence. The cost of the works, up to the present time, has been $200,000; they are situated within two hundred yards of the sea shore, on a piece of land which formerly was a bay used by the fishermen—the cliff rising immediately behind the retort house. The works are now completed for the production of 180,000 cubic feet Spanish per day. In the original plan, it was proposed to adopt the Phœnix mode of setting seven retorts to one fire but, owing to a serious fault in the construction of the flues, the retorts heated very irregularly, and the wear and tear of the furnaces were very great. Since I took charge of the works, I have altered the setting to five retorts to one fire (three and two), with descending flues. I obtain much better results and much greater economy in fuel. I have just commenced substituting clay retorts for iron ones. So far the change is a decided improvement, but, as I employ none but native stokers, I find it requires more attention on my part to secure the proper working of the clays. I use the following quantities and description of coals:—Native Chilian, 63 per cent.; Newcastle, 22 to 23; Boghead cannel, 16 to 17. During the winter months—say in June, July, and part of August—I increase the quantity of Boghead to 20 per cent. The average illuminating power of the gas for the past year has been—in summer, 17½ candles, and, in winter, 20 candles. The native coal yields about 8,000 feet English of gas per ton, of very fair quality; but the coke is small, and very soft and light—in fact, 2,000 lbs. of coal yield only 440 lbs. of coke that will not pass through a sieve with a ¾ inch mesh. I am, therefore, obliged to use English coal, in order to obtain sufficient coke for my furnaces. My purification is a most expensive item in the cost of manufacture. We use lime, or, as it is called here, *Cal-de-Concha*. It is prepared from shells, of which there are immense deposits in various parts on the coast. These shell-beds are quite recent, and are due to the gradual rising which is taking place along the whole extent of coast from Paita, in Peru, to the Straits of Magellan. The shell-lime is very beautiful in appearance, but weak; it costs me here 6s. English for 175 lbs., or one *fanega*; a fanega of lime will purify, on the average, 6,500 feet of gas. I have made several excursions into the interior of the country, in search of limestone, but, hitherto, without success.

During the past year I have delivered 21,500,000 feet of gas, including that consumed by the public lamps. The charge to private consumers is $6 per 1,000 feet Spanish. The lamps are charged $7 each per month, and are not lighted during the moon. The net receipts for gas during the past year have been $104,760, and the average profits for the two years have been equal to a dividend of 15¾ per cent. per annum on the actual capital, in addition to the sum of $21,640, which have been expended in completing the works, and not charged to capital. These profits appear large, but they are not adequate to the risk in such countries as these, where there is so little permanent security. For the first eight months of this year, the country was in a state of revolution; and, for many weeks, I did not know from one hour to the another when I might have an attack from the mobs. Such was the feverish state of excitement at one time, that, if one of the public lamps happened to go out, or one or two burn unsteady, I had a soldier riding down to the works, and thundering at my door at all hours of the night. To give you an idea of my position, I may mention a circumstance which occurred soon after the revolution broke out. In consequence of some defect in laying the pipes from the meter to the gasholder, I was constantly troubled with a stoppage, from the pipe becoming waterlogged. I therefore determined to break the connexion, and lower the pipe so that it might drain into the syphon at the gasholder. Owing to an accident, I did not get the work complete as soon as I expected, and, as both inlet and outlet had to be lowered, I had to cut both pipes; and in consequence of the air getting in, some twenty lamps on the high ground would not light for about twenty minutes after the usual time. This was reported to the *Intendente*, and as it happened that my managing director belongs to what is called the Liberal party, and is opposed to the present government, the defect in the lamps was construed into a revolutionary signal, and orders was given to arrest both the director and myself. I, however, had started on horseback to the point where the defect had occurred, and was in the act of lighting some of the *revolutionary lamps*, at the time a *posse* of police made their appearance to watch my movements. On another occasion, I had notice that an attack on the works was contemplated, and the mob would try to put out the gas by destroying the gasholder. I had a guard of soldiers over each valve, and in the governor-room. I assure you, during the period I now refer to, it was *gas-management* under some difficulties. Within the last few weeks, we have had a new attack made upon us in the shape of a "new company." It appears that some of the Glasgow papers, detailing Mr. Flintoff's exploits in that city, have reached Valparaiso, and the Government party, who are very bitter against this Company and the municipality, who hold a third of our capital, have seized the opportunity to raise an outcry. By their manifesto, the good folks here are promised gas at $3 per 1,000 feet; meters, the same as approved of by *the Queen of England*; gas of the quality as proposed by *Sieur Flintof, en la Ciudad de Glasgow*. Our evil deeds, and the good works of the new *compania*, are set forth in a quarto pamphlet of eighteen pages, in double columns. But the worst feature in this opposition is the part which the Government is taking in the matter. It is clearly a political dodge, to secure votes for the *presidential election*; and I should not be at all surprised to hear that members of the Government had subscribed a large portion of the capital.

VALPARAISO, Dec. 14, 1859. H. G.

BRAZILIAN ILLUMINATING TURF.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

Notwithstanding the existing *furore* in Western Pennsylvania and Ohio, respecting those "living springs of light"—the Petroleum Wells, the rush, excitement and speculation connected with which, reminds one of the palmiest days of California and Australia Gold Fever—a brief account of the singular substance mentioned at the head of this letter, may not prove altogether uninteresting to your readers.

In color, the Brazilian Turf varies from a light to a dark brown, and is marked by numerous thin streaks, running through the mass. In appearance it does not look unlike Portland stone, and sometimes it exhibits signs of a vegetable nature. When struck it has a hollow wood-like sound. When placed under the microscope its layers seem to be more or less permeated by minute deposits of fine quartz, which, from the proximity of the mines to the sea coast, is supposed to have been scattered over by the action of the winds or waves during the process of formation. Were it not for the presence of this sand, the turf would have a specific gravity below that of water, as specimens that have come under my observation, floated on water like cork, while the average weight of a flour barrel full of mixed lots of it, did not exceed 160 lbs. This substance, when boiled in water, yields, as I am assured, a large proportion of tar, which floats to the surface of the water.

According to experiments in the distillation of this material, in Rio de Janeiro, last year, it was found that the Aubin system of letting the steam into the retort, answered well; one lb. of water being used to every ten lbs. of the turf, giving a better yield than by the ordinary process of gas making, and producing a flame of superior brilliancy. Ten lbs. of rosin, six of illuminating turf, half a lb. of water, and three lbs. of saw-dust, produced 160 cubic feet of excellent gas, or rising 18,000 cubic feet to the ton. Another sample of the turf, without any other admixture, yielded 7 cubic feet to the pound, or 15,680 cubic feet to the ton. The coke is, however, valueless. From experiments made in New York, a selected specimen of the turf yielded at the rate of 105 gallons of crude oil to the ton; whilst, from a mixed lot, on another occasion, the yield did not quite come up to 60 gallons to the ton. The tar in both instances was of a very superior quality, closely resembling Western Petroleum.

A thirty years' concession—concession of the mining districts, which covers some thirty square miles of territory—has been made by the Brazilian Government to an American resident of Rio, Mr. F. H. Southworth, to whom the writer is indebted for the specimens left at the Office of the AMERICAN GAS-LIGHT JOURNAL.

The chief deposit is situated on a low tract of land, a short distance from the right bank of the river Acaraby, some twenty miles from its mouth, in about South lat. 13°, and lon. 38° 30′ west, and some 45 to 50 miles south-west of Bahia; the Acaraby emptying into the Atlantic some seven leagues to the southward of that port. The width of the river at the mines is about one mile, abreast of which, the channel of the river is sixteen feet deep. A few miles below the mines, the depth of water in the channel, at low tide, is thirty-five feet, and on the bar, at the mouth of the river, fifty feet, so that vessels of any size and draft can anchor safely within a few miles of the mines, receiving their cargoes alongside from lighters. The mines, it should be stated, are several miles below tide-water navigation. The turf is very easily mined, a common pick, in the hands of a laborer, answering the purpose well, and little or no blasting, it is represented, would be required. The government has also granted the right to the parties working the mines, to import, free of duty, all materials or machinery required in their operations.

The material is very abundant. A Brazilian engineer, who has examined the district of country in question, states that the various deposits must contain many millions of tons of it; a single deposit, according to his calculation, containing not less than a million of tons; whilst a Portuguese engineer estimates the quantity at a still higher rate.

The strata are almost uniformly six feet in thickness. Liquid and solid bitumens are also known to exist in the same region. As there can be no doubt relative to the many excellent qualities of the material itself, the question as to its ultimate introduction into this country as a regular article of commerce, will depend mainly, we should suppose, upon two points, viz., the cost of labor at the mines, and the cost of transportation thence to the ports of the United States.

BITUMEN.

NEW-YORK, April 11, 1860.

GAS APPLIED TO THE MELTING OF ZINC.

The melting of Zinc, generally made in plumbago crucibles, and by a coke fire, requires a somewhat high temperature, the regulating of which is attended with many difficulties; as, beyond a certain degree of heat, it entails upon the operation no inconsiderable waste both by ventilation and by combustion; the latter having the very material inconvenience of imparting to the metal all the objectionable features that zinc founders assign to the so-called *burnt zinc*, and which seem to proceed from the mechanical penetration of the oxyide of zinc, formed by the combustion, into the pores of the metallic moss.

This accident, of daily recurrence in the melting of zinc, called the attention of Mr. MIROY, upon the advantages that might be derived from the use of gas in this operation. His apparatus consists of a cast iron crucible, to supersede the plumbago crucible used in the ordinary process of melting; this crucible may be of a capacity to contain from 30 to 35 kilogrammes of zinc; it is placed standing on a cylinder which maintains it at a suitable height within a furnace of a conic shape, wherein takes place the combustion of gas; this furnace is formed of two concentric sheet-iron envelopes, separated by a packing of sand or of fuller's clay.

The gas comes obliquely from two different sides by means of two pipes, each of these concentric to two larger pipes intended to supply forced atmospheric air. The inside of the gas pipes is 18 millimeters diameter, that of the air pipes 7 centimeters. Mr. MIROY thinks that the volume of air to be brought to bear should be three times that of the gas to be consumed; but by means of cocks these relative quantities can always be regulated. The air is forced through the pipes by means of bellows, set in motion by the machine supplying the moving power of the establishment.

The melting of zinc by gas is more rapid and cheaper than by coke especially when with the latter, a crucible must be rigged for one single melting. The expense of crucibles should likewise be taken into account; it is somewhat considerable by the old coke fire process of melting, whereas it is quite insignificant by the new gas process.—*Le Journal de l'Eclairage au Gaz.*

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THE
AMERICAN GAS-LIGHT JOURNAL.
ISSUED MONTHLY.

TUESDAY, MAY 1, 1860.

We have been receiving for the last four months pressing requests to issue the JOURNAL twice a month, and some rash readers have ventured to insist upon seeing it once a week. Anxious to gratify our friends, we partly promised that, after this date, the JOURNAL should appear semi-monthly; but, on re-considering the matter, we have decided that as one more number will complete our first year, we will finish that, and the inauguration of the second year shall find us a semi-monthly publication. And we may here add, that the price of the JOURNAL will not be, on that account, increased, but it will remain as at present, three dollars per annum. The steady and rapid increase of our circulation is most gratifying to us, including not only this country, but Great Britain extensively, Paris, Holland, Belgium and Germany.

An interesting paper on Water-Gas appears to-day, from the pen of Dr. ANTISELL, author of the recent work on Photogenic Oils, and Chemical Examiner in the United States Patent Office, which position alone stamps anything from his pen with authority. On the other hand, the champions of water-gas demand, and reasonably too, that results shall carry more weight than theory, the full benefit of which will be accorded as soon as the approaching experiments are completed.

Gas officers will notice carefully Mr. P. T. BUNTIS' improvement for balancing gas-holders. It is illustrated in this number by an engraving, and the upsetting of two gas-holders recently, will impress upon engineers what is true, viz., that in their present condition nearly every gas-holder in this country is unsafely hung. The Baltimore, Md., Gas-Works have recently adopted Mr. BURTIS' improvement, and it must come into general use.

We comply to-day with a generally expressed wish to have a portion of this JOURNAL set apart for the interest of coal-oils, which are becoming of more and more importance in this country. When it is remembered that with twenty-thousand towns there are not four hundred gas-works in operation, the next best substitute must be discovered and encouraged until gas-light can be procured; there remain but candles, a few oils, and burning fluid to supply the want. The dangerous nature of the latter is attested daily in the number of accidents reported throughout the land, while the opening of bituminous coal mines in the western and southern States, the increase of coal-oil works, and the improved and economical modes of distillation create a need for an organ to represent them; besides which, in some small towns, the proprietors of gas-works are owners also of oil-works, supplying thus light of the two best kinds, according to the means or fancy of consumers. On our last page will be found advertisements of various coal-oil manufacturers and dealers, and hereafter we shall present regular articles in this interest from the ablest pens in the country.

A simple and highly effective method of adapting coal-oil lamps for use in railroad cars, has been contrived by Mr. Beach, conductor on the Naugatuck Railroad. The light is very brilliant, and burns with as much steadiness while the cars are in motion as when they are stationary. The light equals that obtained from the car gas apparatus, and from the common oil or other illuminating agents.

The paper on the photometric tests of various illuminating materials, by CHARLES M. WETHERILL, Ph. D., M.D., of Lafayette, Indiana, deserves, and will receive universal attention. This document is the result of great labor and study, and repeated experiments, and with the other productions of Dr. WETHERILL, will stamp his name as in the first rank of this department of science in America.

As economy in the management of gas works is being forced upon the attention of all interested and is assuming, every year, more importance, our gas companies will do well to consider, with other methods of diminishing expense, the advantages of using clay retorts. The doubts of gas-engineers, as to the superiority of clay over iron, are much less prevalent now than formerly, and in proportion as a fair trial and a careful comparison have been made, the prejudice in favor of iron retorts has been dissipated. The merits of good clay retorts are based chiefly on the principle that, for the distillation of coal, a very high temperature is required, such as melts or consumes any ordinary material of which the retort may be made.

Iron, when exposed to the intense degree of heat required, gradually wastes away: hence, clay retorts are found to last four times as long as iron ones; because they may be exposed to a continuous high temperature with less injury. For the same reason the yield of gas is increased, as with moderate care such an amount of heat may be kept up as to prevent the formation of the parrafin, napthalin, and other vapors evolved at temperatures below those required for the production of illuminating gas. Under proper regulations, the richness and luminous properties of the gas manufactured is as much improved as its quantity is increased; and as contrivances are introduced for the more perfect control of the temperature to which furnaces of clay-retorts are submitted, these two advantages—the increase of quantity, and the imparting of a richer brilliance—will, doubtless, be found capable of considerable improvement.

The introduction of clay retorts we therefore regard as the commencement of a new era in the history of gas-making. The cost of this kind of retort is not the smallest or least attractive of its advantages. The best descriptions may be obtained at prices considerably below those of iron retorts; the latter, too, require to be guarded by costly masses of brick-work and tiles, which are less required for clay retorts. Hence, a furnace containing five iron retorts, would easily receive seven of clay. The saving of expense, where gas works are contemplating an increase in their power of production, is obvious; for instead of building new retort houses they might, at a comparatively small expense, change their iron retorts for clay, and greatly augment the yield of gas, without enlarging the area covered by the retort-houses. The saving of fuel, where the vast useless masses of brick-work are dispensed with, is also an important element to be regarded. Where the fire can be permitted to act directly on the retort instead of being exhausted in heating the non-conducting masses surrounding it, it is evident that the relative quantity of fuel required must be considerably diminished, while the temperature of the interior of the retort is at the same time brought under more complete control.

Messrs. KING BROTHERS of Stourbridge, England, the well known Retort makers, enter our columns to-day as advertisers. By Mr. King's patent process of burning Retorts, they are sure to be free from cracks and of symmetrical form.

Several correspondents ask our opinion about the relative value of coal and rosin gas. For coal gas, $3 50 is charged in some places near which rosin gas-works are in operation, where the consumers have to pay $7 00 per 1000. The consumers are dissatisfied, but the companies think that $7 00 for rosin gas is as cheap as $3 50 for coal gas. Though rosin gas is generally supposed to be of higher illuminating power and specific gravity than coal gas, practical gas-makers will coincide with us, that their relative value is a very relative thing. The quality of coal gas depends not only from the quality of the coals, but also from the process of carbonization and purification. The same coal may yield gas of a very different quality, and rosin, according to the experiments of Dr. Fyfe, does the same. The relative value of *a* rosin and *a* coal gas must be decided by direct experiment; if 2½ cubic feet per hour of the former will produce as much light as 5 feet of the latter, it will be worth twice as much to the consumer, and in some instances it may be worth still more.

The attention of Inventors and Patentees is now called to the fact that a PATENT DEPARTMENT opens to-day at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, under the charge of F. C. TREADWELL, Jr., Esq., well known as an experienced Patent Agent and Expert. Mr. TREADWELL is assisted by competent draughtsmen, and we promise inventors the utmost promptness, care and economy in procuring patents in this or any other country where patent laws are in force.

We have been favored by the Rev. HENRY MOULE M.A., vicar of Fordington, Dorset, England, with an interesting little treatise by that gentleman, entitled, "National Health and Wealth, instead of the disease, nuisance, expense and waste, caused by cess-pools and water drainage." We heartily agree with the learned author that it is quite within the province of a clergyman to bestow a portion of his time upon the physical as well as the moral and spiritual evils of this life, which latter are, in truth, superinduced by the former. We give also an extract from Mr. MOULE's pamphlet on the vileness of cess-pools, which is recommended to the attentive perusal of our rural readers.

Mr. SAMUEL HUGHES, C. E., F. R. S., of London, author of the treatise on Gas-Lighting has kindly sent us a number of papers on that subject.

From this date subscriptions will be received at these rooms for all the European Journals of Gas-Lighting. Since our little passage-at-pens with the London *Journal of Gas-Lighting*, we admit ourselves to be "quits" with it, and shall hereafter give our contemporary credit for what we borrow from its columns. A list of the European Journals will be found in another column. May we send each of them a thousand subscribers by the first of January next?

The Honorable ANDREW TEN BROOK, U. S. Consul at Munich, has sent us an interesting letter on municipal sewerage, which will bear the most attentive and indeed repeated perusal. It is full of interest and instruction, and will soon force itself upon the notice of our various municipal bodies, whether they wish to look into it or not. It will be observed that Mr. TEN BROOK differs with Mr. MOULE on the effect of soil buried in the earth. Mr. MOULE speaks from actual results, which Mr. TEN BROOK may not have had the opportunity of making.

Gas Engineers will be greatly interested in the paper on the decomposition of olefiant gas by heat, and the formation of gas by carbon, from the pen of our regular correspondent PLATINUM, as well as in the able article on the Practical Management of Gas-Works.

The retirement of Mr. JAMES R. SMEDBERG from the engineership of the Savannah, Geo., Gas-Works, and his election to a vacant chair in the Board of Direction, are announced in another column. Mr. SMEDBERG will, nevertheless, continue to act as consulting gas engineer for those who require his services, and he is also one of the new firm of LINVILLE & SMEDBERG, machinists and engineers, as his advertisements elsewhere indicate. We cordially wish him every success in his new enterprise.

Opposition gas-works continue to be agitated throughout the Union. The programme last received includes Buffalo, N. Y., Boston, Mass., Washington, D. C. In New Haven, Conn., a series of tumultuous meetings has been held, and hard things said by indignant consumers—harder said than thought—but we must say that $4 per thousand feet is too high a price for gas on the Atlantic seabord in this latitude. The price has been recently reduced in New Haven to $3.50, and will be put down shortly to $3. We are satisfied that it is for the interest of all gas companies to sell cheap and thus increase consumption.

WE are now compiling our Tables of the WATER WORKS OF THE UNITED STATES, and the labor will be materially lessened by a prompt and full reply to our questions. In the Correspondents' Column is an interesting letter on this subject, by which it will be seen that that there are many towns waiting to know what has been done before supplying their own wants. We count upon those having information and experience, being very patient and obliging to us in this matter.

The city of Covington, Ky., offers through our advertising columns to-day, the exclusive right to supply water to the city for twenty-five years. Covington is a large and growing city, and we consider this a grand chance for an enterprising man.

It will ensure the sale of a large amount of pipe and other apparatus, of which manufacturers will take note.

THE EUROPEAN GAS JOURNALS.

Subscriptions will be received at the Rooms of the AMERICAN GAS-LIGHT JOURNAL for all the European Journals of Gas-Lighting, as follows:

Le Journal de l' Eclairage au Gaz. Paris. Published twice a month. $3.50 per annum.

Le Gaz. Paris. Published twice a month. $3.50 per annum.

London Journal of Gas-Lighting, published twice a month, $6 per annum. We paid $8 for this year's subscription, but it can be imported at $6.

Journal für Gasbeleuchtung. Munich. Published monthly. $4.50 per annum.

The American postage on the above is two cents each number.

COMPETING GAS-COMPANIES.

NEW YORK, April 28, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

There are at this time, some four or five cities in this State in which attempts are being made to get up competing gas-companies. The promoters of these schemes are mere adventurers, having little or no interest at stake in these cities, and no other object than to make what money they can in the construction of the works, and the disposal of the stock. To these adventurers I have nothing to say. I would as soon think of reasoning with a band of outlaws.

But if the experience of one who has followed the business for a quarter of a century, and who is familiar with the history of gas-companies in Europe as well as those of his own country, can attach any value to his opinion, then there are those who will read these lines, and who will pause, before they become the tools and victims of those who are plausible enough, but most dishonest.

These principles are incontrovertible. Two gas-companies cannot prosper in the same district, if the public are fairly and uprightly dealt with.

No competing gas-company can succeed, if the one already established is managed with ordinary prudence.

Where gas is lowered in price in consequence of competition, it is lowered in quality also.

As soon as the competing Company fails, or amalgamates with the old Company, the price of gas is raised again, and kept up until all losses are made good, and then becomes fixed at a rate that will pay dividends on an unnecessarily increased capital.

It is very well to talk of competition in gas-making, but a moment's reflection will convince gas consumers, that if two Companies compete over the whole extent of their district, there is twice as much capital invested as the business requires, and if both Companies are sustained, then there must be twice as much profit made as there would be, if there was but one Company.

When a competing Company is proposed, the promoters are unwilling to lay mains in outlying or sparsely populated portions, or to light the public lamps at cost, but hope by the investment of a comparatively small amount of capital to strike at the existing Company in the heart of their district, and so by threatening them with the loss of the only really valuable, because the only really profitable portion to bring them to terms.

If the local authorities would impose upon the promoters the same burdens and restrictions which they imposed upon the Company already established, and if the gas consumers would insist upon the mains being extended to those points which probably never would pay an interest on the investment, but which the Company already established has lighted in good faith, then Sir, there would never be such a thing as a Competing Gas-Company.

No Gas-Company can be popular for any length of time, no matter how courteous they may be, or what pains they may take to supply a pure and steady light; the officers of Gas-Companies must expect to be censured, but they must be good natured, and if they cannot please all, they must try to please as many as possible. They must be like the editors, very just, very upright, and very willing to submit to abuse, for the good of the public.

C. R.

GAS-LIGHTING IN GERMANY.

U. S. CONSULATE, MUNICH, BAV., Feb. 6, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL.

In the issue of the JOURNAL for February, you called upon me for an article on Gas-lighting in Germany. You will readily perceive, however, that the investigation necessary to write such an article would cost much time, and the result would be less satisfactory than something from other sources to which I can call your attention.

So far as appearance is evidence in the matter, Gas-lighting is practically better done in America than in any part of Germany which I have visited. A few weeks since, the *Munich Punch* treated the Gas-lighting of this city in the form of a conversation between two boys named respectively "Maxl" and "Shepperl," carried on in their old Bavarian vernacular, and resulting in the conclusion that the Munich system of street Gas-lighting had probably been known to Moses, and that the darkness which he spread over Egypt might have been nothing more than a lighting upon this system.

Professor Pettenkoffer of this place, delivered an interesting public lecture on Gas-lighting, about a week ago in the audience room connected with Baron Von Liebig's Chemical laboratory. In mentioning the different kinds of burners used, he referred to one called the saving-burner, (spar-brenner,) and the smile which ran through the audience indicated, doubtless, a general concurrence in the opinion that the burner mentioned was the one used in the streets of Munich.

While I have no doubt that gas-lighting is quite as well if not better practically done in the United States than in Germany, and Gas is certainly much more taken by families in America than in German cities, I am still of opinion that the scientific and some of the artistic questions connected with the subject are better treated in Germany, than elsewhere.

The most important service that I can render you will be to call your attention to better sources of information. *One* of the best, if not the very best, will be the *Journal für Gasbeleuchtung*, published in this city, to which you referred in your last February number. I can remove your apprehensions of difficulty in communicating with the publisher. I have known Mr. Oldenburg for several years. He speaks English perfectly. The editor, Mr. Schilling, who has called upon me since the appearance of your February number, also speaks English, and desires me to say that he wishes the AMERICAN GAS-LIGHT JOURNAL sent him regularly.

The man whom I have supposed to have given the most attention not only to Gas lighting, but in general to the lighting, warming, and ventilating of dwellings, and especially with reference to health, is Dr. Max Pettenkoffer, Professor in the University of Munich, and Apothecary-in-ordinary to his Majesty the King. He delivered an intensely interesting lecture two years ago, on "*The Air in our Dwellings.*" (*Die Luft in unsern Wohnungen.*) This lecture has since been published. He has just delivered the one referred to above on "*The Light in our Dwellings.*"—(*Das Licht in unsern Wohnungen.*) Professor P. is still a comparatively young man, and the inclination he has shown to use the position of ease in which his Sovereign has placed him, for the investigation of this class of questions so closely connected with the physical weal of man, is promising of good.

In his late lecture, Professor P. exhibited an apparatus of his own, for the exact measurement of the relative amounts of light emitted by any two different light-emitting bodies. I have thought of sending you a drawing of this instrument.

Before receiving your February number, I had sent off a letter* on the "Sewerage Question,"—a question in regard to which I am much better informed, and in which I am much more deeply interested—which you may use, if you choose to do so.

Very respectfully,
ANDREW TEN BROOK.

NEW BRUNSWICK COAL.

Of the two specimens of coal kindly brought to us by Mr J. M. Walker, of St. John, N B., No. 1 is of bituminous schist from Albert Cannel, province of New Brunswick. Seam, two feet deep, yields six feet gas per lb., and ninety gallons crude oil per ton. No. 2 is of bituminous schist, from seam 8 feet deep, yields 4 4-5th feet per lb., and between 60 and 70 gallons crude oil per ton. The coke is valueless, being lime, aluminous clay, and traces of iron. These mines are ninety miles distant from St. John, and about ten miles from Hillsboro', on the Petticodiac river, whence it is shipped to St. John, N. B., and Boston, Mass. The cost at mine is about $2 per ton; transportation by sleds to point of shipment about $2 more, and thence to Boston about $2 more—Total, $6 per ton. Owners of the mines, Caledonia Mining Company, at St. John, N. B.

* This letter we have great pleasure in inserting in another column.—ED.

PLATINUM REFLECTORS.

The circle of the scientific press recommends a silvered glass reflector, or, at all events, one similar to those produced by the usual process of silvering. The difference between the apparatus we allude to and the silvered reflectors is, that the latter are soon deteriorated under the influence of various agents, of gases almost always floating in the atmosphere, and resulting from divers emanations—chlorine, sulphydric acid, &c. At sea, the keeping of such reflectors is next to impossible. The inventor, assisted by the advice of the President of the circle, has substituted platinum to silver. It is well known that platinum is inoxidable under the action of these same gases. We give below the process of the operation:

He precipitates the platinum from a solution of chlorurate of platinum by means of the essence of lavanda, and fixes it by means of a varnish obtained from a solution of borax. He manufactures, by this process, reflectors which preserve their brilliancy any length of time, whilst they do not reach a higher cost than the others. It is to be hoped that this new apparatus will do good service when suitably applied.—*Le Journal de l'Eclairage au Gaz.*

ON THE RELATIVE COST OF ILLUMINATION IN LAFAYETTE, IND.

BY CHARLES M. WETHERILL, PH. D., M. D.

The following experiments were performed with a view of ascertaining the comparative cost to consumers, of its illuminating material of a city of 10,000 inhabitants. Since all of the different kinds of illumination in use were examined, the results may be taken as a fair sample of what is experienced in Western towns and small cities, and perhaps (with the exception of gas-light) in our country generally. I have endeavored, by checks, to exclude the majority of sources of error, &c., by a multiplication of experiments to arrive at correct results, and believe that the conclusions deduced may be taken as a close approximation to the truth.

The photometric accuracy of the apparatus, (Bunsen,) the room and the standard candle, as established, by burning valves of the same candle and different candles of the same box and comparing its results with those obtained by reversing the candles on its photometer-bar.

The lights examined were always burned 4 hours, and the illuminating force determined at the commencement and end of, and at times at intervals during the combustion.

In comparing the different candles, I also burned them together on the same tables, so that an occular comparison might be added to that offered by the photometer and rate of consumption.

I have taken as standard, the star candle, a light in universal use, and the appearance of which is well known to the public. This standard is the star candle of CORNWALL & BROS., Louisville, Ky., and was selected without hesitation, having had the experience of several boxes each of the different candles in use here. It yields a clear light without running and may be steadily burned without flickering, and with as constant a light as that afforded by any other candle. In testing the degree of accuracy of my photometer I always found Cornwall candles equal.

Although the inferences of relative cost of illuminating materials does not depend upon the nature of the standard, (provided its light be uniform), it may be well to compare my standard with others in photometric use. It will be perceived from the following considerations, that mine is undoubtedly equal to these standards. By my experiments the light of the Cornwall candle being equal to 1, that of sperm is also =1 and that of mould tallow =0·76—By HEADLEY'S experiments the mould tallow =$\frac{3}{4}$ of the star. By use this ratio varies for different specimens of candles between 0·68 and 0·91, and by PECLET it is about the same as in Headley's experiments and mine, viz., 0·74. URE found spermaceti star and wax candles equal; so did Peclet with the exception of wax =0·945 of sperm. URE gives a consumption of 142 grs. per hour as the result of many experiments upon his spermaceti candles; my experiments give not quite 147. URE's star candles consumed 168½, mine 159 grains per hour. For tallow, URE found 144, and I 141 grains hourly consumption. The ratio of consumption of my candles agrees very well with that determined by Peclet for similar candles. The wax candles tested by me were of very inferior quality as may be inferred from their melting point.

In burning the standard, I always suffered the wick to grow to its full length curving out of the flame, and then snuffing its red projecting portion, kept it at that length, calling its light 1—If the standard burn thus, another Cornwall candle, or a sperm candle, give the following identical results when burned at the outer extremity of the photometer bar. With projecting wick as such candles are usually burned; Light = 1 0·846—Snuffed, as the standard; Light =1. With ⅛ inch more of the wick cut off; Light 0·846.

Since all of the candles were tested in these experiments with their wicks trimmed as in the standard, it will be necessary to multiply their light by 0·85 to obtain the light with which they burn in common use. Consequently to calculate my results on the basis of the ordinary light of the star or sperm candle, it will be necessary to divide each member of the columns of candle powers in the following tables by 0·85. I have preferred to give what light the respective materials were capable of when burning under the most favorable circumstances. In consequence of the present tendency to gas-photometric tests, every improvement of the instrument is welcomed kindly. I cannot refrain therefore from raising an objection to the growing custom of comparing bright lights and flat flames directly with the uncertain and cylindroidal flame of a candle. If the photometer-bar be 4 feet in length, the position of the screen for a 24 and 25 candle, gas differs only about 0·14 of an inch. This is too small a distance for an accurate placing of the screen, especially when we reflect upon the variation in intensity of light which the candle is capable of. To tell an extreme case; if the candle burning with a light =1 show the gas equivalent to 25 candles, it would give a result equal to 29.4 candles, if it burned with a light =0.85.—Hence, in inexperienced hands especially, its results must be uncertain for such very bright lights.—If we attempt to obtain a wider margin for the position of the screen by doubling the length of the photometer bar, we diminish the light upon the screen in proportion to the square of its distance which renders the contrast of the spot and paper less powerful, involving an additional difficulty in accurately placing the screen.

It does not improve the results much to correct its standard light by weighing the candle, for such light is not in proportion to the material consumed, owing to the influence of the wick upon the *length, shape* and *surface* of the flame, causing its precipitated carbon to be more or less intensely heated according to the length and curve of the wick. This may be distinctly perceived when the flame of a candle lengthens and flickers; to the eye there is a greater volume of flame, and the cup becomes quickly emptied of melted fat; but the flame is not so white, and when tested on the photometer I have found it much less luminous than before. According to URE's experiments a tallow candle may diminish 86 hundredths in light and yet consume nearly the same proportion of tallow. A similar diminution must take place in star and sperm candles, though of course much less extensive in degree, by reason of their much thinner wicks.

More accurate results for higher lights would be afforded by the use of the lamp, suggested by BUNSEN or by the Carcel Lamp,*, its value of either of which *in candles*, could be ascertained with greater accuracy as their light is not very powerful.

Another source of error arises from comparing flat wick with cylindroidal flames.

The flat flame of Ex. 3, Table II. possessed a candle power of 11 on its front and 5·3 on its side aspect, i e., it radiated about ½ the light of its face from its edge. The flame of experiment 10 diminished from face to edge in intensity of light from 5·3 to 3·3 candle power, or as 1·6 to 1. A gas flame of 4·84 candles, but which flickered badly diminished as 1·1 to 1.

Hence, the error in inferring the illuminating power of flat flames from the ordinary photometric results; for while the horizontal path for equal illumination around the centre of a candle or argand flame is a circle, in flat flames it is an ellipsoidal curve of eccentricity dependant upon the width and thickness of the flame. This error in a bright bat-wing flame of 25 candle-power, must be sufficiently great to take into account. No doubt twenty-five standard candles could be so disposed in the center of a room as to illuminate it more brilliantly than by one such gas-flame. The CORNELIUS lamp of these experiments exhibited a flame of 9 candle-power; how much greater would the photometric intensity of its front aspect have been, had it been possible to have slit and spread out the wick yielding a flat flame of nearly thrice the former width!

The remedy for this error is so patent that I hesitate to suggest it, feeling that it must have been already effected. If not, a series of experiments upon this point, embracing the flat flames of different kind, shape and intensity is worthy of attention. It would be easy to subject these flames upon the photometer to a quarter of anaxial revolution, measuring their intensity during the process. A mathematical analysis of the result would enable a specific fraction for each kind of flame to be found, with which to multiply its front aspect candle-power, thus reducing the elliptical path of equal illumination to a circular one. In my experiments on this point, there were only two measurements of the light during the revolution of the flame; viz., from its front view, and after a revolution of 90.° These are insufficient to establish with accuracy the nature of the ellipsoidal curve alluded to; but the following discussion is submitted for want of better data. Suppose the curve to be a perfect ellipse. In experiment 3, the candle-powers upon the front and side aspects of the flame are respectively 11 and 5·3; regard these numbers as *lines* constituting the semi-axes of an ellipse; then the remaining semi-diameters of this ellipse will represent the valve of the candle powers in viewing the flame in their respective directions. The radius of a circle equal in area to the ellipse will represent what may be called the effective candle-power of the flame. In other words, a portion of its light of the front of the flame will be removed, and gradually added to that of the edge, to give an equal light all around the flame, as if it were cylindrical in shape.—A. B. Π. and R^2 Π. are the well known expressions of the areas, respectively of the ellipse and circle in which A and B are the semi-axes of the ellipse, R the radius of the circle, and Π the number 3·1416; consequently, extracting the square root of the product of the semi-axes of the ellipse, will give the radius of the circle equal in area, and which represents the effective candle-power, say at $\sqrt{11 \times 5{\cdot}3} = 7{\cdot}635$. This number represents the effective candle-power of the flat flame in question, for illuminating a room when placed in its center. This number also results by multiplying the candle power, 11 of its front aspect by the number 0·6941.

Experiment 10 calculated in this way gives 5·3x0·789 =4·182 for effective candle-power, and for the gas flame 4·84x0·9535=4·615 effective candle-power.

It may be remarked that, this gas-flame was very unsteady, which increased its extension from a side point of view and also that its light had little intensity, being less dense, also, in respect to the particles of luminous carbon. Coal-oil flames are nevertheless always much thinner on the edge than gas-flames, by reason of the difference of the manner in which they are burned.

Before considering the details of the experiments, I submit Table I., embodying my interpretation of them. The numbers in the lower portion of column 3 refer to and are "*means*" of experiments noted in Table II.

TABLE I.

THE RELATIVE COST TO CONSUMERS OF THE ILLUMINATING MATERIALS IN USE IN LAFAYETTE, INDIANA.

ILLUMINATING MATERIAL.	ORIGIN.	Cost of lb of candl's by count	Cost per Seal lb. or gallon.	Density	Melting points F°.	Consumpt'n in 4 h'rs	1 lb. or gal. lasts hours.	The light costs cts pr. hour	The Star Candle power.	Cost cts. pr. h. l'g 1 Star Candle.
		$ c.	$ M.		†					
Red Wax Candles, 4s..	Josiah Macy, N. Y.	$0·50	0·562		117°–115°	532 grs.	52·63	1·068	0·81	1·32
Green " (fragment)	" "				115 –113	458	61·10	——	0·87	——
Paraffine, 6s.....		0·60	0·689		129 –126	567	49·38	1·395	1·00	0·40
									Snuffed 0·78	1·43
Tallow, 6s.	E. T. Jenks. Lafayette.	0·15	0·161		117 –98½	568	49·73	0·324	Mod'te snuff 0·25	1·29
									Long 0·09	3·59
Sperm, 4's.....	10 years old.	0·40	0·430		117 –113.	587	47·70	0·904	1·00	0·90
Star Candles, 6's.....	Cornwall & Bro. Lou'le.	0·25	0·303		127 –115	636	44·03	0·688	Standard 1	0·69
" 4's, (10 yrs. old)	Work & Co., Cin. (?)	"	0·277		138 –131	694	40·34	0·686	0·89	0·77
" 6's	Procter & Gamble, Cin.	"	0·253		131 –122	702	39·89	0·634	1·00	0·63
" 6's.....	Dennis & Co., N. Y. Cincinnati.	"	0·254		120 –117	825	33·94	0·748	1·00	0·75
		Mean of Ex. See Tab. II.	$ c.		Boil p't. F					
Lard Oil. (Cornelius l'p)			1·20 gal	0·956		12·61 dr	40·60	2·96	9·00	0·33
Burn'g Fluid, (2 wicks)	Avery & Tyler, Lafay'te		0·75	0·854	178°	5·09	100·59	0·746	1·41	0·53
Coal Oil, (large burner)	1st Lucesco.	No. 5	1·00	0·820	356	8·63	59·33	1·69	14·0	0·120
" " "	" "	3	"	"	"	8·50	60·24	1·66	10·87	0·153
" (small burner]	" "	8–16	"	"	"	3·80	134·74	0·742	5·5	0 134
" " "	2d Lucesco.	17–19	"	0·821	"	3·66	140·00	0·714	4·7	0·152
" " "	Adair & Veeder, Pitts'g.	20–21	"	0·820	"	3·83	133·68	0·747	5·3	0·140
" " "	1st Austen Kerosene.	26–27	1·20	0·828	392	8·89	131·62	0·912	5·2	0·195
" " "	2d " "	28–29	"	0·817	"	3·72	137·60	0·872	5·2	0·168
" " "	1st Cloverfoot, Ky.	31–32	1·00	0·809	356	3·65	140·30	0·713	5·1	0·140
" " "	2d " "	33–36	"	0·806	"	3·64	140·70	0·711	5·5	0·129
" " "	Maysville, Ky.	37–38	"	0·810	"	4·07	125·80	0·795	5·8	0·137
" Chrysoline....	Newark O Refinery.	40–41	"	0·818	"	3·64	140·70	0·711	5·2	0·137
" " ...	C. Thumm & Co., Pit'g.		"	0·850	——	——				
Mean of above Oils except Kerosene.....								0·733	5·3	0·138
Mean of Kerosene.. ..								0·892	5·2	0·181
Lafayette Gas.....	Pat. double 2 ft. Burner		3.25 pr. M*			3ft. pr. h		0·975	4·84	0·201
" "	Fishtail 6 ft. Burner					4 "		1·3	6 53	0·200
" "	Reduced to					5 "		1·625	8·1	0·2
Tallow Melts.....	By Dr. Ure.				104°–93°					
Paraffine.....	" "				112					
"	Reynault.				119					
Spermaceti.....	Ure.				112½					
Pure Wax.....	"				154½					
"	Reynault.				149					
Vohl's Photogen Oils..				0·830						

* Metre Rent, 30 cents per month.

† 1st No. is fusing point, 2d No. is point of solidification.

‡11 Candle-power, II URE.

Candles.

The candles tested were purchased at different places, at the retail prices noted in column 3 of the above table. Having weighed a pound, *by count*, of each, its price for a true pound was calculated, giving the results of column 4. The following numbers represent the thickness of the respective candles at the base, with the nature of their wicks:

	Thickness of Candle. Inch.	No. of strands in Wick.	No. of threads in each strand.
Wax, red	7-8	3 loosely braided.	21
" green	13-16	" "	24
Paraffine	7-8	3 braided.	10
Tallow	13-16	Twisted.	24
Sperm	7-8	2 twisted.	18
Star Candle, Cornwall & Bro	27-32	3 braided.	2
Star Candle, Werk & Co.	13-16	" "	27
" " Procter & Gamble	13-16	" "	21
" " Dennis & Co.	13-16	" "	24

The degree of fineness of the threads composing the above wicks varied, the tallow wick being as usual very coarse. The star candles arranged themselves in the following order in this respect, proceeding from finest to coarsest threads: Werk and Co., Dennis & Co., Procter and Gamble, Cornwall & Brother. The wick of Werk & Co. was uneven and tightly braided; that of Procter & Gamble not uniform in thickness of braid. The threads of the Paraffine was the finest of all the wicks.

When the candles were all viewed burning together, the flame of the paraffine at once signalized itself by its shortness, superior whiteness, and steadiness of its flame. The cup formed at the top of the candle is deep, and of sharply defined edge. This candle would make an admirable photometric standard, especially since the fineness of the wick would diminish its disturbing action upon its flame.

Of the star candles, the Cornwall burned in the most satisfactory manner, and the Dennis & Co. in the least so, the latter flickering and running much. The Procter & Gamble candle burned well, but with a tendency to run and flare. The Werk & Co. candle was satisfactory in the manner of its burning, but gave less light than the others. This candle, ten years old, was the whitest and fairest in material of all the stars. That of Dennis & Co. was the *greasiest*. The latter candle is marked "chemical sperm," and is doubtless a mixture of stearic acid, with unsaponified fat. An alteration of the wick would no doubt render the candles of Procter and Gamble, and those of Werk & Co., equal-in every respect to the best star candle.

As may be seen by Table I. the star candles vary very much in cost to the consumer.

A count lb. of	Cornwell & Bro. candle	weighed	5767	grains.
" "	Procter & Gamble	" "	6903	"
" "	Werk & Co.	" "	6316	"
" "	Dennis & Co.	" "	6888	"

instead of 7000 grains. As Procter & Gamble advertise their candles as of full weight, I weighed samples from two different boxes with the above result

The deficiency of weight of the other candles is as follows—a lb. by count, instead of 7000 grains weight:

Of Wax, red, . . .	6224
Paraffine, ...	6096
Tallow, ...	6498
Sperm, ...	6500

The cost of the candles is also effected by the different rapidity with which they burn. See Table I. From column 9, which represents the hourly actual cost of burning the several lights, it is seen that the Cornwall & Werk candles cost nearly alike, viz., nearly 7 mills; that the Procter & Gamble candle is the cheapest, being worth a little over 6 mills; while the Dennis candle is the dearest of all the stars. The sperm candle costs 9 mills per hour, and the Paraffine, at the price received here, is the dearest of all candles. The tallow candle is the cheapest of all the lights in actual cost of burning—a little over three mills per hour; but its light, at the very best, is only ¼ that of the star candle. According to the usual manner of burning tallow candles the light is ¼ that of the star; and with a long snuff, as they are frequently seen, the light is 1-10th that of the star candle.

If we combine the quantity of light with its cost, the Procter & Gamble candle is cheaper than the Cornwall by about ½ a mill per hour; but if we take into account the waste from the facility of running of the former candle, the Cornwall will be found superior to all of the star candles which I have examined. If a tallow candle be kept constantly snuffed, its cost for equal light is less than that of the star candle; but, as usually burned, its cost surpasses that of the sperm, and equals that of the expensive paraffine; while, as frequently seen with a long snuff, its cost surpasses that of all other lights. Ure found that a tallow candle unsnuffed loses in intensity of light, "in 30 minutes, 80-100ths, in 39 minutes, 86-100ths, in which dim state it remains stationery," with which observation my own accords.

Reference to the melting points demonstrates that the sperm candle tested was perfectly pure. These points were determined in the usual manner, by inclosing the substance in a capillary tube tied to the bulb of a thermometer, which was placed first in water gradually heated, and then gradually cooled, determing first the temperature for perfect limpidity, and then that for perfect opacity; as may be seen in column 6, Table I.

Lard Oil.

This oil, the finest variety of the Cincinnati article, was burned in a large Cornelius lard lamp, of which the wick moves between concentric cylinders of diameters respectively 1 inch and 5-8 inch. This lamp, intended for lard, is well qualified for burning oil, which is rendered more fluent by the heater, which produces in a simple manner the effect attained in Parker's ho oil lamp.

The consumption of oil in four hours reaches 12·61 fluid ounces of the U. S. wine pint, costing 2 96 cents; but as the candle power is 9. the cost for equal light is below that of any candle, not excepting tallow burned most favorably. For a star candle, costing ¾ of a cent per hour; for equal lights the ratio of the lard oil to candle cost is as 1 to 2¼.

Burning Fluid.

This dangerous stuff, which ought to find place in a series of experiments only to demonstrate its greater cost, thus driving it out of use by appealing to men's purses, was burned in its peculiar double-wicked lamp. By Table I it will be seen that, notwithstanding its low price per gallon, its actual cost per hourly burning equals that of a star candle with a light of only 1·41 such candle. While it costs less than star candles for an equal light, it is dearer than lard oil, of which the cost is to that of burning fluid as 1 to 1·6, as we shall see it is dearer than gas or coal

(To be continued in next number.)

THE DRY GAS-METER CONTROVERSY IN PHILADELPHIA

A patent for an ingenious and effective improvement in Dry gas-meters was granted on the 10th of April 1860, to R. H. Gratz, Esq., of the well known firm of Code, Hopper and Gratz, gas meter makers, Philadelphia, the inventor being Mr. Charles L. Vasquez, who assigned all his right to the patentee.

The invention, which is very simple in its design and arrangement, relates to that class of dry gas-meters which have six measuring compartments formed by three radial partitions, and three yielding diaphragms, the latter operating in conjunction with a rotary valve, and the invention consists in forming between the level of the valve seat and the measuring compartments, a chamber and inlet pipe so arranged as to convey the gas to the central opening of the valve seat, and so as to afford a means of drawing off the condensed vapor without encroaching upon the space occupied by the measuring chambers, and without interfering with the proper action of the diaphragms.

The difficulties attending the procuring of this patent were of no ordinary character, inasmuch as Mr. Vasquez was the only party who claimed to be the original and first inventor of the improvement.

The following decision of the Commissioner of Patents, will tend to explain the nature of the case.

Decision of the Commissioner of Patents.

In the matter of the interference between the application of Robert Jones and Joseph Lennig, for Letters Patent for improvement in Dry Gas-meters, and the application of C. L. Vasquez, assigner to R. H. Gratz, for a similar invention.

REPORT OF EXAMINER.

February 16th, 1860.

Hon. Commissioner of Patents:

Sir,—On September 28th, 1859, Robert Jones and Joseph Lennig, both of Philadelphia, presented an application for Letters Patent for an improvement in Dry Gas-meters, the nature of which consists in providing the upper diaphragm or plate of the meter with a condensation chamber attached thereto, and connecting with a supply pipe so that the condensed matter from the gas may accumulate in the chamber, and run therefrom through the supply-pipe into the ordinary reservoir-pipes attached to the meter instead of, as at present, being allowed to accumulate on the working machinery of the meter. This condensing inlet chamber in the *diaphragm* was claimed.

The claim as presented was found to interfere with existing patents, and the application was therefore refused on Dec. 9th, 1859.

On January 5th, 1860, applicants renewed the oath of invention, and filed an amended claim confining it to the "combination of the inlet-pipe, with the enlarged horizontal condensing chamber in the meter," which removed the objection of the Office.

On the 23d of December 1859, Charles L. Vasquez, filed an application for Letters Patent for an improvement in Dry Gas-meters, which consisted in forming between the level of the valve-seat and the measuring compartments, a chamber and inlet-pipe arranged substantially in the manner described, i. e., the chamber being placed directly below the valve-seat, and the pipe connecting therewith being on the upper surface of the diaphragm, and the following claim was made: "Forming between the level of the valve-seat and the measuring compartments of a dry gas-meter, a chamber D, and and inlet-pipe G, communicating with the same, both pipe and chamber being arranged in respect to the plate A, substantially," &c.

The invention being deemed identical in view of the amendment made by Jones & Lennig, the Office declared an interference. and fixed the day of hearing on the 13th of February, 1860.

No testimony has been forwarded on the part of Jones & Lennig.

On the part of Vasquez, the evidence of Louis J. Gilbert, shows that while working as a journeyman on Gas-meters at the workshop of Messrs. Harris & Bro's. Philadelphia. he (witness) was shown by Charles L. Vasquez, a fellow-workman, in same shop, an improvement in Dry Gas-meters, which consisted in the peculiar form of valve-seat without curved passages. The model marked Gratz, Exhibit 1, is like what Vasquez showed witness. This occurred sometime between the first and the middle of July 1859.

Witness states that Vasquez subsequently made additions in the shape of Extension of the pipes leading to the inside of the diaphragm, and a circular chamber around the projecting pipes.

Geo. A. Jenks, Attorney, testifies that Vasquez showed him a model of an invention of his in Dry meters. Exhibit No. 1, is a fac-simile of the model he saw. This occurred about the latter end of last July, not later than the 2d or 4th of August 1859, Vasquez told him he was about to obtain a patent for it.

The date of Vasquez's invention as completed is, therefore somewhat about the close of July or 1st of August 1859.

The date of the application of Jones & Lennig to this Office is September 28th, 1859. Vasquez anticipating by nearly two months the application of Jones & Lennig.

It is also in evidence that Jones told Gilbert that Vasquez had shown him (Jones) the valve-seat in dispute, and had offered it to him for sale, but that Jones thought the sum demanded was too high, this conversation occurred in the 2d week of October, when it appears that Jones had an application already before the Office for this invention. It does not appear that Jones during the conversation asserted his claim to the invention then spoken of, as belonging to Vasquez.

As the only evidence furnished clearly shows, that Vasquez is the prior inventor, it is recommended that this interference be dissolved, that Letters Patent be issued to R. H. Gratz, assignee, of said Vasquez for the improvement claimed, and that the application of Jones & Lennig be refused.

Respectfully submitted,
Thomas Antisell.

The foregoing report is confirmed, adjudging priority of invention to C. L. Vasquez. A patent is therefore ordered to issue the assignee R. H. Gratz. Limit of appeal thirty days.

Philip F. Thomas,
Commissioner.

U. S. Patent Office.
23d February, 1860.

NATURAL HYDROGEN GAS.

In the year 1857 the unusally increasing temperature of the soil, in some gardens in the neighborhood of the Church at St. James, at Liege, became a serious subject for public attention. The Health Commissioners of the Province went through numerous investigations to find out the cause of this unaccountable phenomenon.

It had been noticed that the ground in those gardens had warmed up by degrees, till at length all vegetation had disappeared from the surface; the lawns withered, turned yellow and dried up; the trees lost their leaves and died. On ditching the ground to a very little depth, a higher temperature was appreciable to the hand; as the work reached deeper, the heat was found to increase materially its intensity; the earth looked as if calcined, and evolved an offensive smell, diversely appreciated, yet not unlike a mouldy odor; upon close examination, it displayed a quantity of spots showing all the appearance of mouldiness.

The heating did not pervade the whole area of the gardens, but only appeared on various spots, ranging from 4 to 8 square metres in extent: finally it was found that its influence was not limited to vegetables; cellars were mentioned whose temperature had risen to such a degree as to spoil the wines and melt the butter stored in them.

It appears from a late report of one of the committees of the Board of Health, that the heating as observed was not owing to the organic matters originally accumulated at certain points of the soil, or brought in by infiltration, but to a slow combustion of the carbonated hydrogen, (the evolution of carbonated hydrogen is placed beyond a doubt by the sudden combustion which took place on the opening of the well of house No. 35, Boulevard d'Avroy), at the expense of the oxygen of the air, under the influence of the moist vegetable earth; that this gas originates, to all appearances, in the cool stratas, and reaches the surface through the fissures of the ground; and that its presence cannot be assigned to lignites, buried in the sand-beds of the Mense; those lignites should there exist any in that place, being altogether inadequate to produce it.

The means pointed out as the most efficacious and the most ready to obviate the accidents incumbent upon the presence of this gas, is a draining which would consist in sinking vertically in the ground a suitable number of pipes boxed with small lateral apertures, these pipes reaching down one meter or 1½ meter, in other words, as deep as the zone of the maximum heat, and opening freely in the atmosphere.—*Le Journal de l'Eclairage au Gas.*

PATENTS.

UNITED STATES.

27,522.—Wm. S Carr, of New York City, for an Improvement in Valves for Water-closets :

I claim, first, the independent cup leather valve, l, controlled in its motion by a cylinder having a water leakage and closing against the end of a cylindrical passage between the supply and discharge pipe, substantially as set forth.

Second, I claim a slot, x, in a cylinder containing a cup leather or plunger, for the purpose of allowing water to pass gradually from one side of said cup leather or plunger to the other, to regulate the gradual closing of a valve in water-closets, as specified.

Third, I claim closing the water passage in the valve before opening the induction valve, so that there is no leakage or waste of water consequent upon the use of two valves acting successively in opposite directions, and neither of which may be upon their respective seats, as set forth.

Fourth, I claim a cylindrical passage or water way, f, between the supply and discharge pipes combined with an elastic washer or plunger, q, that is forced into said water-way, and acts on the valve, i, substantially as specified.

27,542.—H. P. Gengembre, of Allegheny, Pa., for an Improvement in Apparatuses for the Distillation of Coal :

I claim, first a cylindrical or polygonal retort, having, at the center of both ends, a hollow journal or tube, and being susceptible of receiving a continual or occasional movement of rotation or oscillation around its own axis, for the purpose specified.

Second, The construction and arrangement of the pillow blocks or of the friction wheels, as described, when used for the purpose of causing the motion of the retort itself to make the substance under treatment travel from one end to the other of the retort, and said retort to charge and discharge itself automatically.

Third, The charging box, constructed and operated as described, in combination with the retort, and for the purpose specified.

Fourth, The discharging tube when used in combination with the hollow journal of a movable retort, as described for the purpose specified.

Fifth, The gas pump fan or exhauster, the pipe, V, the tube, H, and the pipe, f, as described, when forming part of a close circuitous conduct for returning over and over the permanent gases in the retort, substantially as specified.

27,543.—Richard E. Harrington, of Newark, N. J., for an Improvement in Gas Retorts :

I claim the employment of a screw, R, fitted to the cylindrical retort, substantially as described, in combination with openings, C D, provided at the top and bottom of the retort, near the same end thereof, as described, for the purpose of arranging or distributing the charge and withdrawing the residuum.

27,545.—James Ingram of New York City, for an Improvement in Fitting Sinks :

I claim a plate, a, attached directly to the wall, or other support, when the pipe or pipes, air vessel or air vessels, are cast in such plate, and the water pipes connected to the thimbles, 1 1, or their equivalents, as specified, and for the purposes set forth.

I also claim the arrangement of the flanges, 4 and 5, for sustaining the sink and shedding off any water that may splash up on to the plate, a, when such flanges are formed on the said plate as specified.

27,553.—Thomas J. Mayall, of Roxbury, Mass., for an Improvement in Hose Tubing :

I claim a hose or tubing formed of two or more concentric, woven seamless tubes, composed of flax, cotton, or other fibrous materials, one over the other, the innermost one having a lining formed either wholly or in part of india rubber or gutta percha, as set forth.

27,557.—John Miller, of Saltpeter, Ohio, for an Improvement in Water Wheels :

I claim the pivotted valves, B, in connection with the conductors E E, in the manner and for the purpose described.

27,567.—Wm. Richards, of Barcelona, Spain, for an Improvement in Wet Gas-Meters :

I claim the adaptation and combination of means in water gas-meters, whereby the more accurate admeasurement of gas may be obtained, substantially as explained.

27,576.—Wm. N. Slason, of South Reading, Mass., for an Improvement in Pumps :

I claim connecting the rocker piston to the curved rim of its case, and so applying such rim to the remainder of the case, as to enable both piston and rim to be moved both together or simultaneously relatively to the said remainder of the case, as specified.

27,595.—E. A. Leland (assignor to himself and Stephenson & Tompkins), of Jacksonville, Ill., for an Improvement in Gas Stoves :

I claim the combination with the base, R, and cylinder, A, of the gas box, a b c, and supply pipe, E, as shown and described, so that the device may be used as a cooking or air heating stove at pleasure, as set forth.

27,876.—Wm. C. Arthur, of Baltimore, Md., for an Improvement in Oil Cans :

I claim the combination of the spring, A, with the valve in the spout, arranged as above described.

27,603.—C. J. Van Wyck (assignor to J. M. McCauley) of New York City, for an Improvement in Apparatuses for distilling Oil from Coal :

I claim the constrction of a retort with a grate, c, in the bottom, and an inclined conductor, E, below such grate as described, such conductor not being the outlet for the gaseous products of combustion of the fire by which the retort is heated.

[This invention consists in a certain construction o an apparatus for distilling coal or other substances with provision for the simultaneous extraction or solution and separation of oils or other products of two different qualities or specific gravities]

27,765.—James Aldrich, of Washington, D. C., for an Improvement in Water Elevators :

I claim the mechanical arrangement of the pulleys, e1 e2, the sliding bolt f, and spring, t, the rope, g, the guide, h, and socket, s, the rods, l l, and guides, r r, or their equivalents, for the purposes set forth.

27,767.—Luther Atwood, of New York City, for am Improvement in the Distillation of Hydro-carbon Oils :

I claim the use of steam in preparing a hot still for the safe admission of a charge of oil, substantially as described.

27,768.—Luther Atwood, of New York City for an Improvement in Apparatuses for the distillation of Coal Oils :

I claim, first, a volatile oil still, capable of being heated at the sides and constructed with a removable lower section, consisting of the bottom and a short section of the side, substantially as described, and substantially for the purposes set forth.

Second, The combination of a weighted safety valve with a volatile oil still, constructed substantially as described, and so arranged as to relieve the still from pressure when the condenser becomes choked.

Third, The steam pipe and valve, O, safety valve, N, and closed angle valve, L', when used in combination with a still and steam boiler, substantially as described.

Fourth, The steam pipe and valve, P and angle valve, L', when used in combination with a condensor and a steam boiler, substantially as described, and substantially for the purposes set forth.

Fifth, The use, in combination, of two or more manholes in the top or cover of the still, substantially as described, and substantially for the purposes set forth.

Sixth, The use of the main, N4, in combination with the safety valve, substantially as described, and substantially for the purposes set forth.

Seventh, The described mode, substantially, of setting a still so that the lower section can be removed without disturbing the main body of the still.

27,775.—Samuel Chamberlaine, of Philadelphia, Pa., for an Improvement in Apparatuses for Generating Gases :

I claim, first, combining the two vessels, A and B, which contain the gas-making ingredients, by means of a siphon, C, substantially as described, so that, when a reduction of pressure is produced in the generating vessel by permitting the escape of gas or air therefrom, the acid or other liquid from the other vessel will be caused to flow over into the generating vessel by the difference of pressure.

Second, The arrangement, in combination with the two vessels, A and B, and their connecting siphon, c, of the two three way-cocks, or their equivalents, E and G in the outlets of such vessels, the connecting pipe, h, between the said cocks, or equivalents, and the piston, H, geared with said cocks, or equivalents, whereby, when the pressure in the generating vessel reaches a certain degree, the gas is caused to flow back to the other vessel, and so prevent more acid or other liquid coming over from the latter vessel, and when a further increase of pressure takes place providing for the escape of gas to the atmosphere, substantially as described.

Third, The pumping apparatus, consisting of the cylinder, M, with its partition, i, two connected pistons, K K', passages and double-four-way-cock, L, applied substantially as described, in combination with the generating apparatus and the receiver or cooler, O, to deliver gas and water simultaneously into the receiver and cooler at a uniform pressure.

27,842.—D. S. Stombs of Newport., Ky., and Julius Brace, of Point Creek, Va., for an Improvement in the Distillation of Coal Oil :

We claim the herein-described process of re-distilling crude oil or other oils by means of an apparatus constructed on the principle substantially as specified.

27,847.—Charles L. Vasquez [assignor to R. H. Gratz], of Philadelahia, Pa., for an Improvement in Dry Gas Meters :

I claim forming between the level of the valve seat and the measuring compartments of a dry gas meter, a chamber, D, and an inlet pipe, G, communicating with the same ; both pipe and chamber being arranged in respect to the plate, A, substantially as and for the purpose set forth.

27,612.—Harkness Boyd, of New York City, for an Improved Trap for Water Closets :

I claim, as a new article of manufacture, the trap or bend for water closet and other pipes, cast in half sections, as specified, whereby the metal is formed of additional thickness at the joints and parts exposed to strain or wear, as set forth.

27,624.—Deiderich Fehrman, of Liverpool, England, for an Improvement in the Manufacture of Resin :

I claim the combined process described, having for its object the manufacture of resin, as set forth.

27,646.—Henry Napier of Brooklyn, N. Y., for an Improvement in the Manufacture of Resin :

I claim the within described method of producing white resin, at one continuous operation, substantially as set forth.

27,649.—E. T. Orne, of Boston, Mass., for an Improvement in Gas Regulators :

I claim the employment of sawdust or wood filings as a filtering medium for gas-burners.

I also claim, in combination with the use of said material, the above-described burner, consisting essentially of the cylinder, A, and ring, f, operating substantially as set forth.

27,670.—Jacob F. Hunter (assignor to himself, H. A. Hunter and P. P. Keller), of New York City, for an Improvement in Hot Water Apparatus :

I claim the combination of the coils, F G, with the main pipe, J, fire back, A, return pipe, J, and casing, K, when the said coils are both connected with the main pipe, J, and back, A, and otherwise constructed as shown and described, for the purpose set forth.

[The nature of this invention consists in a novel arrangement of pipes with a water-back ; said pipes communicating with the radiators in the building from the top of the apparatus, and said radiators communicating with the water-back by a return pipe, by which arrangement a large heating surface is obtained, with an economy of room, expense, and a proportionate saving in fuel.]

27,673.—Robert Ross (assignor to himself and Geo. J. Stannard), of St. Albans, Vt, for an Improved Horizontal Water Wheel :

I claim the arrangement, in a center vent water wheel, of the plates, D E, fitted respectively into the scroll and to the wheel, as described, and connected to the frame, G, to operate as and for the purpose set forth.

I also claim, in connection with the above, the projection, h, at the end of the plate, D, when fitted in the socket, i, to leave a space, j between the projection and the back part of the socket, for the purpose specified

[The object of this invention is to obtain a center-vent water wheel that may have its capacity readily varied according to the power required, and a uniform speed obtained with a varying power as occasion may require]

J. Milton Sanders, of Cincinnati, Ohio, for an Improvement in the Production of Illuminating Gas. Patented July 27, 1858 :

I claim the production of an illuminating gas by passing the vapor of water and a hydro carbon, or its equivalent, mixed previously to decomposition into a retort containing carbon at a high red heat, substantially in the manner set forth.

27,676.—Edward H. Anderson, of Easton, Md., for an Improvement in Vapor Burners :

I claim the original arrangement of the apparatus set forth, and the new and useful adaptation of them to the purpose of producing a light which will be economical in cost, and which will be entirely exempt from the danger attending many other gas lamps.

I also claim the invention of a new and useful mode of procuring light by the combined action of atmospheric air and heat, by means of my original adaptation of the jet holes, N N, in the upper end of the conducting pipe, A, acting upon the under surface of the chamber D ; the blow pipe principle of the jets producing the requisite heat to manufacture the gas as required for the support of the flame, and which combination enables me to raise the flame above the entire apparatus, thus rendering it clear of all obstructions : all constructed and operating as set forth.

27,679.—Geo. K. Babcock, of Utica, N. Y., for an Improvement in Measuring Faucets :

I claim connecting to the slide or valve of a faucet, a scale beam or weighing device, arranged to operate as shown, or in any equivalent way, so that the substance to be drawn may be measured by its weight.

I further claim the combination of the scale beam, I, pawl or catch, H, arm, F, lever, D, and value rod, C, with its valve, B, fitted within the tube, A ; all arranged for joint operation substantially as and for the purpose set forth.

27,689.—Jesse Burroughs, of Ridgway, Pa., for an Improvement in the Purification of Coal and Ores :

I claim preparing coal for burning and ore for smelting, by steaming it with a liquid composition of water, salt, niter, potash and lime, in the proportions substantially as set forth.

27,711.—Harvey Guild, of New Orleans, La., for an Improvement in Siphons attached to Gas Retorts :

I claim the annular siphon composed of an upright cup, A, with a flaring or funnel like mouth and central tube, a, and a moveable inverted cup, D, provided with projections, c c, by which it is enabled to be supported by the flaring or funnel-like mouth of the cup, A, as described.

[This invention consists in a siphon of annular form, constructed in a novel and simple manner, which enables it to be taken apart very conveniently for cleaning or for any other purpose.]

KING BROTHERS,

STOURBRIDGE, ENGLAND, FIRE-BRICK AND RETORT WORKS.

By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

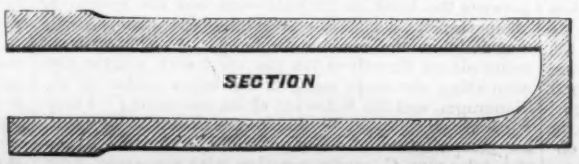
RETORT OVENS, FIRE-BRICKS, GUARDS SADDLES, RABBITTED BURS, FLUES, AND QUARRIES, ARE ALL MANUFACTURED OF THE SAME QUALITY OF CLAY.

HEAD OR MOUTH PIECE.

HEAD OR MOUTH PIECE

KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for Burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them

FREE FROM CRACKS AND CORRECT IN FORM.



EVERY RETORT AND BRICK IS BRANDED "KING BROTHERS, STOURBRIDGE."

ANSWERS TO CORRESPONDENTS.

G. P. of Geo.—We do not know anything of the durability of India-rubber bags as gas-holders. They are not in use here yet, and we refer you to Mr. Jas. Lyne Hancock, of London, for practical information on the subject. We heard the other day that a little darkey jumped on one that was in use, and when he hopped off the expansion of the bag drew in the lighted gas and exploded, sending Ebony into the room above.

M. X. of Md.—The engineer of whom you speak is quite competent, and not at all bashful about undertaking an opposition works. He is not employed in the works you name.

L. & Co. of N. Y.—You had better leave it alone.

G. M. of Pa.—Clay retorts are fully discussed in the columns of the JOURNAL, *and their superiority to iron is admitted we believe, universally.*

F. M. F. of N. O.—The post-office boxes are used in this city. No instance of their having been picked by means of wires has occurred.

REPORT OF THE BALTIMORE, MD., GAS-LIGHT CO.

We find the annual report of this Company to their stockholders, upon our table. It is signed by Columbus O'Donnell President, J. M. McCulloch, Arch. Stirling, Marcus Denison, Austin Jenkins, Directors. By an Act of the Legislature of Maryland, passed at the last session, the Company is authorised to increase its capital from $550,000 to $2,000,000. The report then alludes to the excellent quality of the gas made at the works, and to the mistaken notion of the false registry of the meters, and as a proof of it asserts that out of 4,000 bills due February 1, 1860, not more than sixty were increased at all over the previous year, while as many were diminished. It adds, very sensibly, that every one's expenditure for gas is within his own control, and if he will only regulate the number of burners in his house he will regulate the size of his bills.

The Company are constructing new works, and the President and his Engineer and Superintendent have recently been to this city to purchase all the new improvements to add to their efficiency. We had the pleasure of seeing them occasionally at our Rooms while here The price of gas has been reduced from time to time, from $7 00 to $2 70 per 1,000 feet, and on 1st Oct. next, it will be further reduced to $2 50, and an intimation is foreshadowed that a reduction even below that will follow. The report is a straight forward, square-toed document, without any high-falutin sophistry to befog the reader, and commends itself to the good sense and the entire confidence of their customers.

DISINFECTION OF WATER AND SEWAGE.

Mr. Robert L. Pell read a valuable paper on Sewerage at a late meeting of the American Institute of the State of New York, of which we have made free use in the following article.

In England, Mr. Nathaniel Heckford, a public-spirited gentleman residing at Forest Gate, in the county of Essex, has just patented a method for purifying the Thames and other rivers. He proposes to erect powerful forcing machinery, and to deliver the water at two or more points—for the Thames, at Chelsea and Blackfriars. Night-soil he proposes to treat by introducing sea-water into cess-pools, or other receivers, from which the soil is led into some sewers other than the river, and through drains or channels constructed for that purpose. The soil is subsequently collected and applied as manure, its fertilizing properties being increased by com-mixture with sea water.

Dr. Hoffmann with Dr. Frankland recently presented an elaborate report to the Metropolitan Board of Works on London sewerage. An enormous variety of suggestions were passed in review; they had to consider proposals for disinfection by protosulphate of iron; by superphosphate of magnesia and lime; by galvanic or electric agency; by the manganates and permanganates; by the ferruginous sulphate of alumina; by chlorine; by "the antiseptic hydrochloric acid, liquified protosulphate of iron, and chloride of sodium combined;" by perchloride of iron; by sulphuric acid; by the abolition of water-closets, and the substitution of boxes containing peat charcoal, (G. Garbert, Esq.); by "cendre noire," a pyrito-aluminous lignite, much used by the scavengers of Paris; by "pyritous peat;" by "dosing the river with carbolate of lime in solution, and the use of a solid mixture of sulphites and carbolates; by the use of scrap iron and subsequent filtration; by the separation of the sewage from the rain fall; by a plan hitherto impossible, but rendered feasible; "by the discovery, in November last, of something in the nature of steam which was hitherto unknown (Rev. H. Moule);" by a mixture of sulphate, oleate, and chloride of zinc, and of sulphate of zinc; and by other chemical and mechanical methods, either unexplained or tedious to describe. The trials made by Dr. Hofmann and Dr. Frankland lead them to recommend a concentrated solution of perchloride of lime, to which Mr. Ellerman has called their attention. It is superior to the chloride of lime both in the immediate and permanent effect produced; it is also superior in the rapidity of clarification after the the addition of the disinfectant. The cost of disinfection is estimated at a probable sum of about £14,000 ($70,000) per annum. The actual process of deodorization will present less difficulties than the mechanical separation of the deposit by filtration or subsidence. This is a question for engineers. Most undoubtedly the reporters are right in suggesting that enormous operations of this kind should, as far as possible, be conducted at a distance from densely-populated districts. But, after all, do you really *disinfect* by simply *deodorizing?*

All offensive smells from the decomposition of animal and vegetable matter, in our city, indicate the generation and presence of the causes of insalubrity and of preventable disease, at the same time that they prove defective local administration. And collaterally, that, in rural districts, all continuous smells from vegetable decomposition indicate preventable loss of fertilizing matter, loss of money and bad husbandry.

Of the first of these two facts any one may convince himself who will take the trouble to visit the portions of New York city afflicted with small pox, typhus and scarlet fever, and any other endemic disease of a contagious nature. His own sensations will immediately indicate the seats of insalubrity. He will feel a sickening, deadening depressing sensation caused by breathing the air mixed with organic vapors arising from decay, as well as offensive and pungent odors; and though those odors invariably indicate danger, it does not by any means follow that danger does not exist when there are no such warnings, as the danger is frequently greater when no warnings exist, from foul air, which does not affect the olfactory organs so strongly.

In the absence of hydraulic or steam works, for the drainage of our down town city houses, various palliatives of the evils connected with the retention of refuse beneath or near dwellings, have been tried, but invariably proved unsatisfactory.

The discharge of vegetable or animal excretia from houses through drains into sewers, as practised in the upper parts of the city, is most certainly wrong, from the fact that they are immediately carried into the North or East rivers, converting those splendid streams into common receiving sewers. This is not all; the outlets of the sewers into the river are, or soon will be, so low that their contents will be delivered at, or perhaps a little above, low water level. These decomposing, filthy matters are consequently delivered near the banks of the rivers, and left there to stagnate and poison the atmosphere, and to be brought up by every tide for the thorough pollution of the waters. In too many of these sewers the tide ebbs and flows, the immediate consequence of which naturally is, that the proper discharge of the sewerage is suspended, and the gases engendered by the decomposing mass within the sewers are driven back towards the point from which they issued; this renders it necessary to cleanse them by hand, as we have often observed foul sewerage matters being raised to the stone curbs, to be conveyed away by carts, and again thrown into the river, with the same obstinate attempt to pollute its waters with a constant accumulation of solidified refuse. Who, knowing these facts, can possibly relish those delicious luxuries, fish, that constantly feed and grow fat upon such matters?

Now, let us banish the idea of turning the North and East rivers into common sewers, and consider how the sewerage can be best arranged, by making use of the present sewers, by intercepting their contents before they reach the rivers, and forming receptacles in which to collect them. By this course we shall promote the public health, for the sewerage can be collected, raised, dispersed and treated without the least detriment thereto, and the cost will at least be balanced by the advantage of applying sewerage as a manure or an enricher of the soil by irrigation.

It is well known that the contents of sewers consist of human and animal excreta, earthy matters, carried down by the surface water from the streets, with a portion of decayed vegetable and animal substances, which, during putrefaction, disengage ammonia; and if this process takes place in the open air, it mingles with the atmosphere in the form of carbonate of ammonia, and leaves the sewerage in a less valuable condition.

This admirable substance may be fixed in very many ways, by the use of chloride of calcium, muriatic or sulphuric acid, and even superphosphate of lime—all of which are cheap articles of commerce. If you would try an experiment to test the fact, fill a basin with concentrated muriatic acid, and place it in the City Hall water-closet, and you will soon find it filled with crystals of muriate of ammonia. Chemistry thus comes to our aid, and teaches us the means by which nearly, if not quite all, the offensive properties of sewerage water may be easily suppressed, and the useful properties retained for agricultural purposes. There is, therefore, no reason why a receptacle at the foot of each of our sewers in which the sewerage may be collected, should be, in any one respect, more disgusting to the senses, or injurious to the health of our citizens, than a reservoir of pure spring water.

The next question to be asked is, whether the agricultural value of the sewerage will pay the expenses of collecting and applying it? We answer, unconditionally, that it will. The expenses will embrace the construction of receptacles at the river end of the present sewers, and they may all be connected, as was proposed by myself, at the last meeting of the Farmers' Club, by proper pipes, with two large receiving reservoirs, one on the east and the other on the west side of the city, and from there be driven by steam machinery through mains, under the Harlem and Hudson River railroads, to the agricultural districts. The economy of transmitting such matters through mains is well understood, and the cost has been estimated, by competent engineers, at five cents per ton for a distance of five miles, and to a height of two hundred feet. This includes interest on capital invested, and all current expenses.

The cheapness of lifting and removal on a large scale by steam power, renders the question of levels far less important than it has hitherto been considered. The expense of raising forty-five thousand gallons a hundred feet high, by a twenty-five horse power engine, is about eighteen cents. There appears to be some misconception in relation to the power of pumping, and apprehensions are sometimes expressed, that mixtures of common street compost would clog the pipes, and could not be pumped. This is a mistake; as I have seen, in potteries, tolerably thick mud, usually called slip, which is composed of clay mixed with granite and powdered flint, say one and a half tons of water to a ton of solid matter, pumped and distributed with great ease.

In illustration of this principle we will endeavor to estimate the value for agricultural purposes of the excrementitious matters flowing from a town, from which estimate the pernicious effect of discharging those matters into the courses whence the supply of water is derived for the several uses of the population may be readily inferred. The value of manures as promoters of vegetation is known to result from their possession of the essential element, nitrogen, in the form of ammonia, with the subordinate properties of alkalies, phosphates and sulphates. Now, the experiments of Boussingault and Liebig have furnished us with the means of estimating the quantity of nitrogen contained in the excrements of a man during one year, at 16·41 lbs., upon probable data, and also that this quantiy is sufficent for the supply of 800 lbs. of wheat, rye, or of oats, or of 900 lbs. of barley. This is much more than it is necessary to add to an acre of land, in order to obtain, with the assistance of the nitrogen absorbed from the atmosphere, the richest crops every year. By adopting a system of rotation of crops, every town and farm might thus supply itself with the manure, which, besides containing the most nitrogen, contains also the most phosphates. By using, at the same time, bones and the lixiviated ashes of wood, animal excrements might be completely dispensed with on many kinds of soil. When human excrements are treated in a proper manner, so as to remove this moisture, without permitting the ammonia to escape, they may be put into such a form as will allow them to be transported even to great distances. Making reasonable allowance for the reduced quantity produced by children, we shall be safe in assuming the nitrogen thus resulting from any amount of population to be equal to the supply required for affording 2 lbs. of bread per diem for every one of its members! Or assuming an average of 600 lbs. of wheat to be manured by each individual of the population of New York, and taking this at three-quarters of a million, for a rough calculation, the manure thus produced is sufficient to supply the growth of wheat of a total weight of 450 millions of pounds. The total manuring matters, solid and liquid, produced in a town, allowing for those which are produced in manufactories and sewage water, are probably equal in weight to one ton annually for each member of the population, or 750,000 tons produced in the metropolis. That this vast quantity of manure should be made available for agricultural production is a principle which cannot be denied, and which is properly limitable only by the consideration of expense as weighed against the value of the results. The expense will be made up mainly of three items, viz., of the collection, of the raising, and the distribution of the refuse matters. The collection being an item common to all methods of disposal, will not be chargeable entire in any comparative estimate, but as modified by the peculiarities in the collection of which the plan is susceptible. The cost of raising is of course wholly chargeable to a system of artificial dispersion, as distinguished from the prevailing modes of self-discharge into low channels, but the former system will be debited only with the excess of expense (if any) beyond that incurred by the present methods of distributing the manuring matters for use upon the land. Though the cost of each of these works may be reduced to a minimum by skillful arrangements, experience is at present insufficient to determine these with precision.

Flatbush, N. Y. This thriving little town on Long-Island, near New York, is going in for gas. Enterprising builders of gas-works will do well to look after a contract there.

HEMPSTEAD, N. Y.—The gas-holder of these works fell over on last Saturday evening, from weakness in the knees. A deputation of Directors of the Company undertook to replace it when it took another roll and came near rolling them into the middle of next week. A few dollars extra expended at the outset would have averted this trouble.

A NEW OIL-SHALE.—Samples of a new variety of bituminous Schists, found within six miles of Pictou, Province of Nova Scotia, have been left at the rooms of the AMERICAN GAS-LIGHT JOURNAL.

It is said to make a superior quality of crude-oil, and parties in this city are about putting up works at the Mines with the view of supplying the New-York market with the crude-oil for refining purposes.

APPLETON & GRAHAM'S PORTABLE GAS-WORKS.—We omitted to call attention, in the last number of this JOURNAL, to the admirable gas-works of Appleton & Graham, of Boston, illustrated on page 213 Parties interested will refer to their advertisement in this number

WILHELM'S TRANSPARENT GAS-LIGHT SHADES.—We have been presented by the patentee with one of these beautiful shades, which is indestructible by fire, and a great ornament to the tea-table. They are made by Wilhelm & Co., of Philadelphia.

THE VILENESS OF CESS-POOLS.

The cess-pool and privy vault are simply an unnatural abomination. People boasting of civilization and cleanliness are accustomed to it, and therefore they still to a great extent endure such a mode of removing filth. With the one object of getting offensive matter out of sight, they form so many treasure-houses of bad smells and noxious gases, so many sources of disease and death; and, at the same time, waste the most natural and effective fertilizer of the soil.

The water-closet, used in connection with the cess-pool, has only increased these evils. It affords convenience, and in some cases relieves offensive smells; but, in many others, these smells are rendered even more offensive, and the evil of noxious gases increased and brought nearer home.

While, again, in the system of the water-closet combined with water-drainage, these evils are only shifted. They cannot be said to be remedied. The individual house and premises may be relieved from the presence of filth, but it is at the expense of spreading it through the sewers of the town, and of sending the noxious gases through the gully-holes into the midst of the population; those gases, too, being rendered more noxious by the spontaneous fermentation of ammoniacal substances when mixed with water. The town may still in various ways be relieved; but it is at the expense of the neighborhood through which the stream or river that receives this sewage may pass. And while the sums spent on this system are vast, and the waste of valuable manure by its means almost incalculable, this too much boasted remedy already calls for the application of remedial measures!

Every house, excepting in some of the most wretched and crowded parts of large towns, may, with ease, and without public works, and without offense, deodorise and remove effectually and completely its privy soil, and all greasy matter. And one of the best sanitary laws which could be enacted, would be that which should forbid, under heavy penalty, the erection of any house or cottage in town or country without room or provision (and it would not be large) for this purpose.

The great and in most cases the only, agent in this mode, is dried surface earth, the extent of the capabilities of which, both for absorption and for deodorising offensive matters I accidentally noticed about seven months ago, and the truth and correctness of which observation I have since proved by daily experience.

The power and efficacy of this agent will, however, be best understood and believed if I give a simple narrative of what during the last six months it has done for my own family, averaging during that period fifteen persons daily.

Eight months previous to this period, under a strong impression of the evils either occasioned, or likely to be occasioned, by the vault or cess-pool on my premises, and feeling it to be a nuisance to my next neighbor, as well as to myself, I filled it up with earth, and ever since I have had everything that would otherwise have gone into it received and removed in buckets. And even this mode of removal, though offensive in idea, has proved far less so in reality, than even a very small portion of the evils it is intended to remedy. At first the contents of these buckets were buried in trenches about a foot deep in my garden; but on the accidental discovery that in three or four weeks after being thus deposited, not a trace of this matter could be discovered, I had a shed erected, the earth beneath it sifted, and with a portion of this the contents of the buckets every morning mixed, as a man would roughly mix mortar. The whole operation of removing and mixing does not occupy a boy more than a quarter of an hour. *And within ten minutes after its completion neither the eye nor nose can perceive anything offensive.* This was the first observation I made. The next was this, that when all the earth *which did not exceed three cartloads*, had been thus employed, that which had been first used was sufficiently dried to be used for the same purpose again; and it absorbed and deodorised the offensive matter as readily as at the first time. And so singularly does this capability continue, that a portion of it is now being used for the *fifth* time for the same purpose; and thus all that offensive matter, which otherwise would have been wasted in the vault, a nuisance to my house and the neighbourhood, and a source, it may be, of sickness and disease, is now a mass of valuable manure, perfectly inoffensive both to the eye and nose. I have taken fifty or sixty persons to see it without previously acquainting them with its nature, and not one has guessed it. All have declared it to be wholly without offense. Two have handled and smelt that in the afternoon which had been mixed in the morning, without being able to discover its nature. And more than this, I have the same day submitted some to strong fire-heat; and that which, unmixed with earth, would under such heat have been intolerable, in this mixed state emitted no offensive smell whatever.

Again, I have found the efficacy of this dried earth equally great when applied in sufficient quantity to the horrible refuse of a slaughter house, and that after the earth had been previously mixed three times with the contents of the buckets.

Here, then, in the roughest and rudest mode of employing it, is an agent of a most important character in the work of cleansing houses and towns. Its advantage over water for such a purpose is complete. Water is only a vehicle for removing it out of sight and off the premises. It neither absorbs nor effectually deodorises. It rather, both in cess-pools and in sewers, aggravates the offensiveness by the fermentation which soon sets in, and is often repeated; and further, it dilutes and wastes a most valuable manure. Whereas dried surface earth both absorbs and deodorises the most offensive matter, and that almost instantaneously; and under such circumstances as those narrated, it seems to preserves its full value for agricultural purposes. One experienced farmer who has visited my garden, is so fully satisfied of this, that within a fortnight he prepared a shed that he might pursue the same course.—*Rev. Henry Moule, M.A.*

MUNICIPAL SEWERAGE.

U. S. CONSULATE, MUNICH, BAVARIA,
Tuesday, Jan. 24, 1860.

To the Editor of the AMERICAN GAS-LIGHT JOURNAL:

The importance which the sewerage question has assumed in London, and the means which I here enjoy of knowing some things in relation to it before they become generally known, induce me to make it the subject of a letter in the interests of Agriculture. The noxious matter discharged by the sewers into the Thames had so accumulated, its stench become so offensive, and its influence upon health so deleterious, as to have given rise, even years ago, to various representations, serious and comic, in all the English and Continental journals, and to the most perplexing problem which the City Government had to solve. The Commissioners of Sewers have called for proposals for the removal of this matter, and received, and either rejected or neglected one after another, until the pressure from various directions can be no longer resisted, and they must act. An essential part of this pressure may have been that upon the olfactories of those to whom it belonged to decide the question. But there were other influences. The subject was in every man's mouth. Even statesmen deemed it not beneath their notice. Lord PALMERSTON, as early as 1851, at the dinner of the Royal Agricultural Society at Lewes thus expressed himself:

"I cannot but think that the progress of chemical science, and the application of that science to practical agriculture, may, lead to something which will render you less anxious and solicitous about this same guano, and that instead of sending to the other end of the world for more manure for our fields, we shall find something nearly, if not quite, as good within a few hundred yards of our dwellings. [Hear, hear, and cheers.] Now, gentlemen, I have heard a definition of dirt. I have heard it said that dirt is nothing but a thing in the wrong place. [Hear, and laughter.] Now the dirt of our towns precisely corresponds with that definition. [Hear] The dirt of our towns ought to be upon our fields, and if there could be such a reciprocal community of interest between the country and the towns, that the country should purify the towns, and the towns should fertilize the country, [laughter,] I am much disposed to think that the British farmer would care less than he does, though he still might care something, about Peruvian guano. [Hear, hear, and cheers.] Now we all acknowledge that there are certain laws of nature, and that those who violate those laws invariably suffer for it. Well, it is a law of nature that nothing is destroyed. Matter is decomposed, but only for the purpose of assuming some new form useful for the purposes of the human race. But we neglect that law. [Hear, hear.] We allow all decomposed matter in our towns to pollute the atmosphere, to ruin the health, to produce premature misery, to be pestilent to life and destructive to existence. Well, gentlemen, if, instead of that, there could be a system devised by which these substances, which are obnoxious where they now are, could be transferred so as to fertilize the adjoining districts, I am persuaded that, not only would the health of the town population be thereby greatly improved, but the finances of the agricultural population would derive considerable advantage from the change." [Loud cheers.]

The last essential contribution to that pressure which has finally forced the Commissioners of Sewers to something more decisive, was probably the letter of Baron LIEBIG to Alderman MECHI, under the date of the 17th of November last. This letter has doubtless been published and widely circulated in America before this time, as a copy was sent from here to New-York in advance of its appearance in either the English or continental journals.*

The above-named letter has elicited some correspondence which I am permitted to refer to, and which shows the final decision in the matter of the London sewerage—a decision the motives to which may be applied on the other side of the Atlantic. The correspondence to which I mainly refer is that of Mr. SHEPHERD, civil engineer of London, with Baron LIEBIG, in regard to the feasibility of the plan of the former for removing the contents of the London sewers. Mr. S.'s plan was presented in 1849, but the Commissioners took no action. Since that time all has been words without action, until now. Mr. S. now writes that his plan has received the approbation of the Commissioners of Sewers—that it had previously been approved by the great agriculturist, Alderman MECHI, and the late distinguished engineer Mr. STEPHENSON, and that a company had been formed under the patronage of the great landowners to carry it out. He asks leave to use Baron L.'s name as consulting chemist to this company, and also expresses the desire to receive a note for insertion in the newspapers, giving, in regard to the practicability of the plan, the same opinion which Baron L. had previously expressed in a private letter. This latter desire was based upon the fact that in LIEBIG'S *Agricultural Chemistry* a doubt had been intimated as to the possibility of overcoming the difficulties which stand in the way of making city sewerage available for agricultural purposes. Baron L. mailed his note a few days since, stating in effect that this doubt has been removed by the study of Mr. SHEPHERD'S plan.

As the above-named plan is about to be carried into execution, I will attempt a brief statement of its main points, as given in a pamphlet published more than two years ago.

It is proposed to use the present sewers, and construct others where these are not sufficient, and thus to conduct all the sewerage matter to points selected for that purpose in the immediate vicinity of the several grand divisions of the City. Here all is to be discharged into reservoirs, from which it is to be pumped up by steam power to the nearest summit, which shall be deemed high enough to send it to every part of the entire section of country over which it is to be distributed. For the Surrey side, it is proposed to have the reservoir on the top of Shooter's hill. The distributing reservoirs must be of a size proportioned to the amount which must be accumulated before it can be used.

From these reservoirs the liquid is to be conveyed to the farming districts through pipes 18 inches in diameter, and from these, branches are to pass off at such distances as the distribution to every acre of land shall require. From an inquiry as to the average amount of water used in families, and discharged through the sewers, it has been estimated that the entire amount of matter passing through the sewers of London, annually, will be about 70,000,000 tons, and its state of dilution will be such that 750 tons will be little more than equal to one ton of guano. It is supposed that 40 tons can be profitably used upon an acre of ground, and hence 1,750,000 acres will be supplied by the sewerage of London. The cost per acre for distribution can be estimated from the following statement of Mr. MECHI, made in the London *Times* in 1852. He says:

"The new system of irrigation, by subterranean iron pipes, with hose and jets worked by steam power, is complete on 170 acres at Tiptree Farm.† The cost independent of steam-engine, £3,15s. per acre, added as it were to the fee-simple of the estate. The working cost of conveying and applying to each acre 15 tons of the liquid manure, or water equal to a heavy rain of five hours' duration, is about 1s 6d. The liquid is distributed through a fan-like gutta-percha spreader, issuing as a broad, thin, glassy sheet, and descending in heavy drops."

Mr. SHEPHERD, using the above statement of Mr. MECHI and some other materials, estimates the cost of applying the liquid to 50,265 acres, as follows:

To district reservoir	£4,000
To ten miles of 18-inch cast iron sewerage main, at £3,000 per mile, inclusive of laying down	30,000
To small mains and pipes for 50.265 acres, including other contingencies, at £4 per acre	201,060
To steam-engines and pumping-apparatus, say 10 per cent.	23,500
Total cost for 50,265 acres	£258,560

Mr. SHEPHERD proposes to furnish the farmer with 750 tons of the liquid sewerage matter for £15, the present price of a ton of guano, and at this rate of sale, he promises to divide to the stockholders of the company more than 12 per cent. annually upon their investment.

The number of engines, their power, and the entire expense of the pumping up, are estimated from the statistics of the pumping of the water from the Cornwall mines, from which it appears that the 70,000,000 tons of the London sewerage can be raised 350 feet high, for distribution over the country, by steam-engines representing only 3,200 horse power.

The general plan is, I think, made quite clear by the above brief statement. I shall now proceed to take up some questions connected with the application of this or a similar system in the United States; for it is quite certain that something must be done to avert the impending ruin of American agriculture—a ruin already widely spread in the Atlantic States, and although slightly arrested by the use of guano, still spreading towards the West, driving agriculture before it into the wilderness, and of course demanding an increasing amount of its products to be sunk in their turn in the sewers of the Atlantic cities.

I am, however, neither chemist nor engineer nor farmer, and shall therefore use freely the facts and principles brought forward in the pamphlets from England, put into my hands by BARON LIEBIG; those contained in some of his own letters, in which I have become much interested before I knew him personally; and especially shall I avail myself of the results of my conversations with him, which have been frequent and intimate for nearly two years past, and have often turned upon this subject. I ought also to add that this letter has been written at his suggestion, and, at his special desire, has been read to him—a desire to which I have yielded the more readily from the hope of availing myself of his suggestions.

This system proposed by Mr. SHEPHERD will not be a sourse of expense, but of revenue, to the cities which shall adopt it. The sewers will remain the same whether they discharge their contents into rivers or into reservoirs, except as they may need to be extended in order to reach the points appropriate for reservoirs. The extra expense will therefore be merely that of pumping up the sewerage matter to elevations sufficiently high for distribution. But the amount which the farmer will pay for the liquid will, according to Mr. S.'s estimate, even from the very beginning, be sufficient to divide to the stockholders more than 12 per cent. upon their investments.

But the farmer who avails himself of this plan must increase the capital invested in his farm by about £5 3s.

* This valuable letter appeared in the February number of the AMERICAN GAS-LIGHT JOURNAL.

† The arrangements of Mr. MECHI, at Tiptree Farm, are described by *Dickens' Household Words* for August 7, 1852.

—say $25—to the acre. This, at first view seems very considerable. But let it be observed that the labor and capital necessary for carrying on the operations of the farm will actually be greatly diminished by this system. If forty tons of manure to the acre must be brought upon a farm in any other way the labor would be really fearful to contemplate. But on this plan the cost to each acre of land receiving forty tons of the liquid manure would be about as follows: Interest on the original investment, say $25 at 6 per cent., $1 50; cost of 40 tons, £1 for 50 tons, say $4; and the expense of applying it, according to Mr. MECHI, 1s. 6d. for every 15 tons—making the entire annual expense of applying 40 tons to the acre, including interest on the investment, $6 50—a mere trifle compared with the investment in horses, wagons and labor, for the transportation of 40 tons of manure. Now, it is admitted that $6 50 to the acre would be a large expenditure, if the result were to be but an increase of production to the amount of five bushels of Wheat, at $1 per bushel, but an insignificant one if it were to result in five or ten times that amount of increase. It should not be forgotten, that, on the supposition of a double production, the farmer would need, in order to secure a given amount of the products of the soil, to own and cultivate but half the surface which would be necessary on the supposition that the productiveness is but half the amount per acre.

And what is the probability as to the increase of fertility of the soil by the plan proposed, or its retention, perhaps I should say? Since there can be no aggregate universal increase, the increase of fertility must be simply in the neighborhood of cities, or consuming districts, and can only be equal to the loss in fertility of the agricultural districts which furnish them their food. Mr. SHEPHERD gives, in his pamphlet, some good illustrative statements on this subject. One of these, communicated in a letter from HENRY CAUNTER, Esq., to the author, under date of December, 1856, is as follows. He says:

"As an illustration of the extraordinary effects of sewerage water, even in a high diluted state, I will mention that beautiful valley in Devonshire, immediately below the little vilage of Ashburton. The stream of water which runs through the place receives all its sewerages and the wash of two or three manufacturies, and is afterwards, by a well-arranged system, made to irrigate the valley below for nearly three miles in extent, until it falls into the river Dort. The produce of this valley is perfectly astounding and no stranger can ever pass along the high road from Ashburton to Buckfastleigh without being at once struck with the luxuriance and abundance of the pasture around him. I should tell you the *average* rental is about £6 ($30) per acre; but it sometimes lets at fabulous prices, especially in a late cold Spring; the last meadow (mowing) is as good as the first. Another fact is that the water rises on the high moor-lands, and is no use for irrigation, but absolutely injurious to the soil before it receives the sewerage or wash of the town."

The population of Ashburton is said not to exceed 2,500.

The following is also abridged from Mr. SHEPHERD'S pamphlet: The Town Council of Malvern, in Worcestershire, drained their town, discharging their drainage into the nearest rivulet. This ran through the estate of a noble lord, who threatened prosecution for the nuisance. The Council, not knowing what to do, applied to two farmers to know if they could not use it for agricultural purposes. They applied it first to some grass-fields, and with the astounding result that five times the former amount of hay is made upon the same ground—it is mowed six weeks earlier than formerly, and three times during the season, instead of once. Those who have used it say that they prefer the sewerage at the price at which Mr. SHEPHERD proposes to sell it, to guano. Other farmers have observed the effect, and are turning their attention to it. The above are some of the illustrations given in the pamphlet.

To the same effect is the substance of a letter, which Baron LIEBIG has received since the publication of his own letter to MECHI, from the Austrian commander of the garrison in the fortress of Rastadt. He writes that he formerly had to pay several thousands florins yearly for having the privy vaults of the barracks cleaned out. But the peasants of the village of Oligheim, having learned the value of this kind of manure, now pay 8,150 florins yearly for it, and remove it themselves. The garrison consists of 8,000 men. The result had been to restore fertility to land which had become waste.

In regard to the unpleasant smell and the influence upon health: For the City of London these questions can hardly be raised, for the offensive smell and the sad effects upon the health of the city from the deposit of the sewerage matter in the Thames are already there. There is no election. The question forces itself upon the city and demands immediate decision. Other cities, however, are differently situated. They can still, perhaps, as hitherto, dispose of their sewerage matter where it may not offend their senses or affect their health. The only motive, therefore, in many cases, to urge immediate action will, perhaps, be the arresting of that process by which the soil is fast losing beyond recovery its productive power. Can this substance be used in agriculture without offense to our senses or damage to our health?

The slightest reference to the above-mentioned plan will decide this question in general. The whole sewerage matter, both in its collection into reservoirs and its distribution to the country, runs in underground pipes, and smell is impossible, except in the vicinity of the reservoirs. The main sewers are to be connected with the chimneys at the engine stations, and thus the whole system will be ventilated, and all the noxious gases drawn off where they can do no harm. There can be no smell or any injurious effect upon health at those points where the liquid is scattered by means of hose upon the land, as it is taken up the moment it strikes the ground mixed with the quantity of water which is naturally used in every family, it becomes nearly deodorized, or deprived of smell—the cows are fond of eating the grass immediately after it has received its shower of the liquid, and the intelligent visitor at Malvern found himself scarcely able to detect a smell, even in holding the water to his nose. Indeed the smell would be much less than that arising from the spreading of farmyard manure in its solid state upon the fields.

Providence has now forced the city of London to action in this matter, perhaps for the purpose of calling the attention of the rest of the world to that wasting process which will soon reach a point where decrease of population will begin. There may be many towns of the smaller class which have, without knowing it, the same sanitary reasons for action in this matter which London has.

An intelligent gentleman from Georgia, now here, tells me that in many of the small towns on the rivers in Alabama and Georgia, where the yellow fever was formerly unknown, it has now become very common. This, he thinks, may be owing to the want of some proper system of cleaning the privy vaults. This is done there, as doubtless largely in the North, when the accumulation can no longer be endured, by shoving the contents aside under ground from the bottom of the vault. Thus the whole amount is left in the ground, and must more or less defile the water of the wells and produce sickness. Like the housewife who has the dirt all swept under beds and bureaus, the people of these towns will find that the dirt is still there, and will at some day, however distant, utter its testimony against them. How strikingly true is it, that there is no safety in fighting against a Divine law! Nature demands that all taken from the fields shall be restored to them. We have fought against this provision until the increasing sterility of our fields, and the rapidly multiplying inconveniences and dangers of our city populations, begin to proclaim aloud our transgressions.

How many towns are there situated like Malvern and Ashburton, mentioned above, with elevations enough to distribute their sewerage matter to the surrounding country, without the use of engines to raise it? In many European cities it is deemed worth while, without sewers to transport this matter to the fields in wagons. In Munich this matter is removed in this way, with no other attempt at preventing the unpleasant smell than by working only in the Fall and Winter, and in the night. Thus none except those who are out later than they should be during the Fall and Winter nights are subjected to this unpleasant visitation more than once a year. When this work is to be done, the families occupying the premises have a notice served upon them, that they may shut their doors and windows and stay at home. It is, however, only to a limited extent used upon the fields, the most of it is still thrown into the Isar.

In Florence it is better There they have a water-tight vault in each court for all the houses to which the court is common. The solid matter is diluted with the entire amount of water used in the families. In this vault is a pump, to which, as often as necessary, a hose is attached and the liquid pumped into large casks, which stand near upon wagons, and thus it is drawn into the country with very slight unpleasantness. There may therefore be some choice of means for effecting this purpose, according to the circumstances of different places.

It is scarcely worth while to say a word in support of Baron LIEBIG'S theory. Its truth is beyond a doubt, and probably no one who has studied it doubts its truth. Still, objections have been raised by men not wanting in intelligence, but who have occupied themselves mainly with other matters. Mr. MECHI had 500 extra copies of the *Times* containing LIEBIG'S letter to him struck off and sent to the newspapers of the United Kingdom. It was everywhere published, with editorial remarks, *some* of which were by way of objection. The most common objection was in a form something like the following: *The process of which Baron Liebig speaks with such alarm must be a very slow one, for portions of the earth at least have been for thousand of years under cultivation, and are not yet exhausted.*

The above objection presents rather a historical than scientific question. It seems to demand to what extent and for how long time this exhausting process has been going on in each particular piece of ground. To give a minute and detailed answer would be impossible; though a general one is easy.

The system of drainage now so common has but recently become so. All countries have not been exporters, and none for a long time. In many countries the products of the soil have scarcely been to any considerable extent transported from one part to another, each section has lived upon its own products and allowing them to return to the soil for reproduction. The loss to the land is only equal to the difference between that which has been taken off and that which has been restored. Where the entire food consumed in a country is used upon the soil, the question whether that soil becomes richer or poorer, must depend upon the relation of the imports and exports of food. It will be found that those countries of Europe, Asia and Africa, which are supposed to have been for thousands of years under cultivation, have either exported but little, and restored to the soil, the mass of its productions, or else the parts have been cultivated in succession, new sections having been brought under tillage as the old ones have been exhausted. This latter is the process which is now, with such inconceivable rapidity, going on in the United States, driving agriculture to the newer as it ceases to be productive in the older sections. The prosecution of the present system will soon complete the work of exhaustion. On the continent of Europe, Hungary, Moldavia, and Wallachia, and parts of Russia, remain unexhausted and rich enough to export largely. Some other European countries can still produce their own supplies of food. The wilds of North and South America are yet to be travelled over, and the end will then have been reached.

The most conclusive answer, however, to the objection—the firmest support to Baron LIEBIG'S doctrine—is the cry in every farmer's mouth for manure. Why is not his soil as rich as when the forests were first felled and the land subjected to cultivation? Can any reason be given other than that he has taken off more in his crops than he has restored? If he has sent all his wheat to the market, and restored all his straw to the fields, he may still reap tolerable crops of straw, but the wheat production will have fallen off. He may plow deeper and pulverize the soil more thoroughly, that the roots may better penetrate it and thus come in contact with an equal amount of nourishment for several successive years; but this process, without restoring that which had been taken off, will only exhaust the soil more rapidly.

Whether there is any way of restoring in the future that which the soil has lost by the present system of city sewerage, is a question scarcely worth a moment's attention, unless it be for amusement. The fish brought up from the waters may restore to the land an infinitessimal portion of those productions of the soil which had been cast into the sea. Guano, formed as it is from the deposits of sea-birds, comes, of course from the sea, but is found only in parts where no productions of the soil have been carried thither by the present sewerage system of cities. The hope that the ocean will retire and leave guano islands as the products of the sewers of our Atlantic cities, is one which concerns only the inhabitants of a world which shall rise out of the ruins of the present. Italy and the North African Coast have never yet recovered that fertility which old Rome discharged through the Tiber into the Mediteranean, although by exporting little and more carefully restoring to the land what had been taken from it, it continues to yield a scanty support to a greatly diminished population. Our hope is to save what we have,—not to recover what we have lost.

The question as to the effect of the general introduction of such a system as that of Mr. SHEPHERD described above, upon the distribution of population, wealth, and the various branches of industry, is one of great interest. The vicinities of the great cities and the densely populated manufacturing districts where agriculture had nearly ceased, would become greatly enriched in their soil at the expense of those sections of the country which send them their food. Agriculture would be resumed in the neighborhood of cities and in the manufacturing districts. As these districts would produce much more of their own food, the amount of transportation from the newer parts, and, of course, the process of exhaustion of the soil in those parts, would be diminished. As agriculture returned to regions from which it had retired, so manufactures would travel to those into which they had not previously been introduced. There would be a more general distribution of the industrial occupations. Each would perhaps become a little more independent. The excessive tendency to centralization would probably receive a check. Commerce would not, of course, be diminished, but would naturally increase less rapidly. If the commerce of some of the larger cities did relatively decrease, agriculture in their vicinity would increase in an equal or greater ratio; for the neighborhood of the greatest consumption of food would have the grestest fertility of soil. A very considerable revolution, from the want of which we now suffer, would be introduced. May it soon come! Very respectfully.

ANDREW TEN BROOK.

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I am, gentlemen, your very obedient servant,
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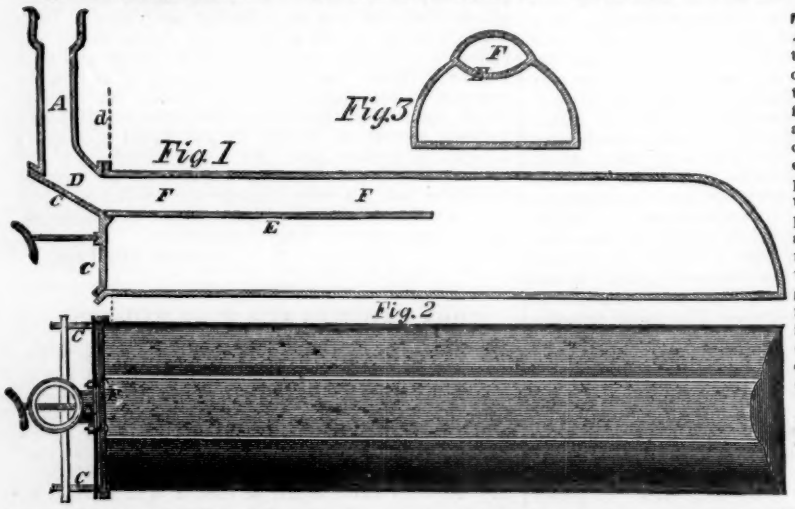

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SEYTON & WAINWRIGHT, 37 William street, New York city. Sotck and Exchange Brokers, General Railroad and European Agents. Stocks and Bonds bought and sold at the Board of Brokers, and at private sale. Railroad and other loans negotiated, and collections made for home or European account. *Exchange on London.*

C. S. SEYTON, J. H. WAINWRIGHT.

REFERENCES:

Duncan Sherman & Co., Richard Irvin & Co., John B. Murray, and Union Bank, New York; Webster Bank and Peter Wainwright, Esq., Boston; E. F. Satterthwaite, London; Alfred F. James, Galveston, Tex.; Ogden, Fleetwood & Co., Chicago; Erastus Corning, Esq., Albany; W. Fisher & Son, Baltimore; J. P. Kilbreth, Cincinnati; G. Parish Ogden, Troy.

GAS-LIGHT STOCKS FOR SALE. THREE HUNDRED THOUSAND DOLLARS of Stocks in various Gas-light Companies in the United States, paying from 6 to 12 per cent. dividend, for sale by

JOHN B. MURRAY,
Rooms of the AMERICAN GAS-LIGHT JOURNAL.
New York.

FREEZING OF GAS-PIPES.— Walton's Patent Anti-Freezing Apparatus illustrated by engravings, in the AMERICAN GAS-LIGHT JOURNAL, of May, 1860, page , is the most simple, durable and efficient of any known process.

According to Professor Faraday, the watery vapor contained in illuminating gas amounts to 0·0093 parts where the gas is at a temperature of 40°, or in other words, that there are 1, 7-10 *gills water in every* 1,000 *cubic feet of gas* at that temperature. It is the deposit of this water in the form of frost that closes the exposed pipes.

Walton's plan is, in a few words, to supply this water with a sufficient quantity of alcohol (98–100ths), the vapor of which will enable it to pass through the most exposed pipes, unaffected by frost. Experiments of three years prove that one gill of such alcohol will protect 1,000 feet of gas at that temperature. Private houses, Hotels and Gas-works, can be thus guarantied from frost by the use of Walton's Anti-Freezer, which consists of but two or three small castings, at the most trifling cost. It can be applied at Gas-works without altering any of the pipes; and the expense of labor and the alcohol will not exceed two cents per 1,000 feet of gas.

It can be seen in operation at the rooms of the AMERICAN GAS-LIGHT JOURNAL, where orders will be executed at once.

Read the Following Testimonials:

GAS-WORKS, CINCINNATI, O., 24th May, 1858.

MR. JOHN WALTON,
Louisville, Ky.:

DEAR SIR,—At an earlier date, I intended to have written you the result of my experience during last winter, in regard to your patented apparatus to prevent the freezing of gas in pipes. I am quite convinced that both in theory and practice your apparatus is correct, and in no case will it fail to prevent the freezing in pipes of our illuminating carburretted hydrogen gas, provided attention is paid to renew the alcohol often enough in proportion to the amount of gas passing through the anti-freezing apparatus.

Yours truly, JOHN JEFFREY.

OFFICE LOUISVILLE, KY., GAS CO., March 30th, 1860.

In the winter of 1856, this Gas Company first applied John Walton's patent method for the prevention of Frost in Service Pipes,—to this date we have used it with periect success. *This Company have Purchased the Right to this Patent for Louisville, Kentucky.*

The application of a vessel, containing a small quantity of alcohol, placed between the gas main and an open area connected with a building, through which the service pipe was laid, has always prevented the freezing or stoppage of the service pipe, although the temperature may have ranged from the freeezing point to several degrees below zero.

As the alcohol absorbs from the gas any vapor of the water that may be passing off with it, after passing the vessel containing alcohol, there remains in the gas nothing that can freeze or close the pipe. *This simple application, we have proved to be an effectual safeguard against the closing of gas pipes with frost.*

ROBERT G. COURTENAY, President.

MANUFACTORY OF GAS APPA-RATUS—IMITATION BRONZE.

Universal Exposition, 1855. Medal—2d class. Trade mark. H. F.

HUBERT FILS,

4 RUE THORIGNY, NEAR THE RUE DE LA PERLE Au Marais, Paris, France,

Furnisher and Contractor of the great gas establishment of the French capital. Introducer of Gas-light into Theatres, Railway stations, &c.

GAS-FITTER AND WATER PLUMBER.

Economy, luxury and permanency guarantied FOREIGN ORDERS EXECUTED.

E. V. HAUGHWOUT & CO.,

488, 490, & 492 BROADWAY,

Corner of Broome Street,

NEW YORK.

Messrs. E. V. Haughwout & Co. have on hand a most extensive assortment of the newest and most desirable styles of

CHANDELIERS, BRACKETS, LAMP POSTS, AND GAS FIXTURES OF EVERY DESCRIPTION,

To which they would respectfully call the attention of the public.

Gas-fitting done in the most workmanlike manner, and on reasonable terms.

SAMUEL DOWN,

Nos. 340, 342, 344 and 346 West Twenty-second Street, North River, NEW YORK CITY,

MANUFACTURER OF

WET AND DRY PATENT GAS METERS,

Pressure-Registers, Pressure-Indicators and Gauges, Station, Show, Customer, and Experimental Gas-Meters, Centre or Hydraulic Valves, Governors, Compensators for Exhausters, and the Standard Testing Gas-Holders* for Proving Meters, now used in the State of New York in compliance with an Act of the Legislature. Also, Bunsen's Photometer, with complete Apparatus for working the same.

*The standard of measurement of this Gas-Holder is given by Professors TORREY, of the U. S. Assay Office; JOY, of Columbia College; GIBBS, of the Free Academy and several other distinguished scientific gentlemen.

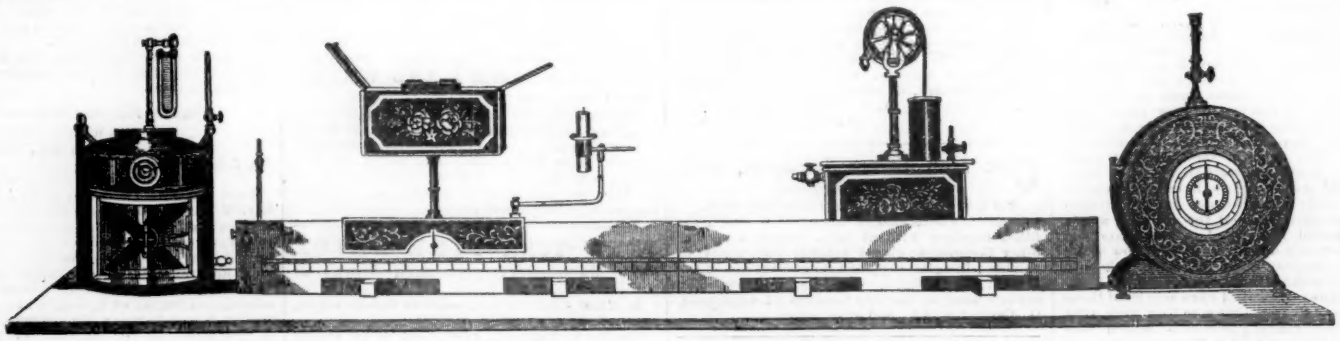
ELLIMAN BROTHERS, 217 Pearl Street, NEW YORK,

Importers of Belgian Fire-Clay GAS-RETORTS,

AND DEALERS IN

TILES, ARCH-BRICKS, FURNACE-DOORS, MOUTH-PIECES, COVERS, AND ALL OTHER FITTINGS, OF MOST APPROVED PATTERNS, FOR SETTING CLAY RETORTS, EXHAUSTERS, COMPENSATORS, VALVES, &c.

IMPORTERS AND DEALERS IN WROUGHT-IRON GAS, WATER, AND STEAM TUBES.



PRESSURE REGISTERS,

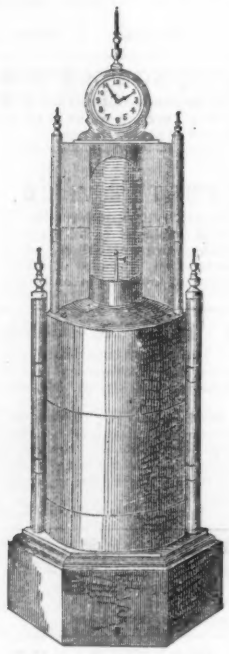
PRESSURE INDICATORS, }

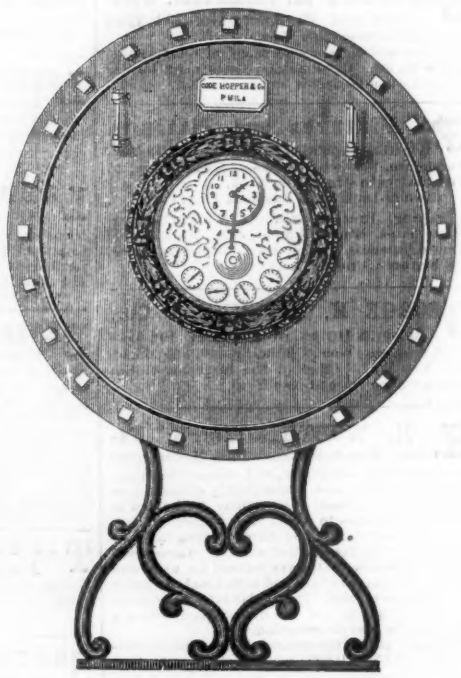
PRESSURE GAUGES, }

PHOTOMETERS,

GOVERNORS,

STATION METERS





CUSTOMER METERS,
(Wet and Dry.)

EXPERIMENTAL METERS,
(Wet and Dry.)

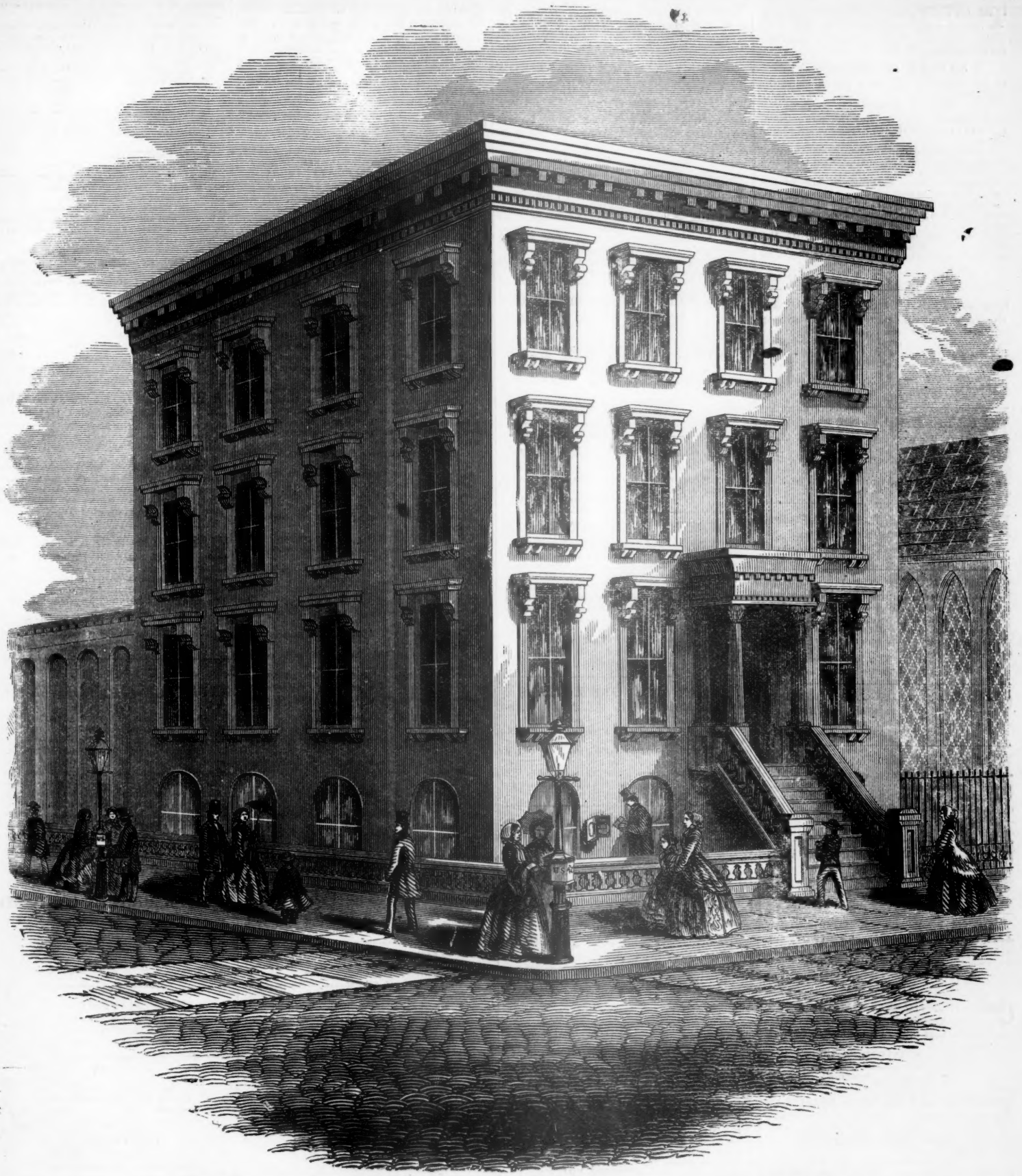
HOW METERS,
(Wet and Dry.)

METER PROVERS,

CENTRE SEALS,
&c. &c. &c.

THE high reputation which we have enjoyed for more than twenty-two years, and the fact that we have manufactured a greater number of Gas Meters than all other manufacturers in this country combined, must present itself as a security to parties desirous of securing the most reliable instruments. Having completed an extensive addition to our factory, and added many important improvements to our machinery, we are enabled to fill orders entrusted to us with dispatch, and in all cases *guarantee entire satisfaction.* Our Patent Rotary-Valve Dry Gas Meter is now used by upwards of two hundred gas companies, giving general satisfaction; we therefore recommend it, believing it superior to any other Dry Gas-Meter manufactured. All meters tested separately by a sworn Meter Inspector, and sealed when desired.

CODE, HOPPER & GRATZ,
1500, 1502 & 1504 FILBERT STREET,
PHILADELPHIA.



THE TWO GREAT PATENTS OF THE DAY.

1.—Improved Mode of Setting Gas-Meters in the Walls of Buildings.
2.—Cast-Iron Mail-Stations for Public Lamp-Posts.

Adopted by the UNITED STATES GOVERNMENT for the Principal Cities.

ALBERT POTTS, Philadelphia, Patentee.

By the FIRST IMPROVEMENT the Meters may be inspected at any time from without, by the agents of the Gas-Company having keys for that purpose. Thus burglars need no longer gain admittance to dwellings under pretense of examining the meters, while they, in fact, examine the fastenings. The meter-box, being neatly and securely imbedded in the front wall, the meter is protected against frost by means of a thick pad on the back of the door. It has been satisfactorily tested in long continued severe weather and found to be eminently successful.

The SECOND IMPROVEMENT speaks for itself. The cities of New York and Philadelphia are already supplied with these boxes and the convenience to the citizens and increase of revenue to the Post-Office Department are most marked. Always in sight, securely fastened to the most public objects, protected by light, day and night, they have become the most popular of all modern improvements and will be immediately adopted throughout the country.

Both of these improvements are to be seen at the Rooms of the AMERICAN GAS-LIGHT JOURNAL, New-York City. For further information address the Proprietor of this JOURNAL, who is authorised to contract for the use of both Improvements, or

ALBERT POTTS, Philadelphia.

TO INVENTORS.—Patent Agency of the AMERICAN GAS-LIGHT JOURNAL.—The Proprietor of the AMERICAN GAS-LIGHT JOURNAL, is happy to announce that a

PATENT DEPARTMENT

Is now connected with these ROOMS, under the charge of

MR. F. C. TREADWELL, JR.,

Well known as one of the most prompt, reliable, and able Patent Agents and Experts in the United States.

Patents taken out in this County, and in GREAT BRITAIN, FRANCE, BELGIUM, and All Other Countries where Patent LAWS are in force.

Re-Issues, Rejected Applications, Interference Cases, attended to with the utmost personal care, and with Mr. TREADWELL'S long experience in them, the interests of Patentees will be unusually secure.

Inventors are cordially invited to visit the ROOMS of the AMERICAN GAS-LIGHT JOURNAL, Iron Buildings, No. 254 Canal street, East, near Broadway, New York. JOHN B. MURRAY, Proprietor.

TO SOUTHERN GAS-LIGHT COMPANIES and Contractors, about Putting up Gas-Works in Warm Climates.—The undersigned is prepared to furnish, at a very considerable discount, for cash, a large number of Wet [redacted] Gas-Meters, each of which have passed inspection by the State Inspector.

HORATIO EAGLE, Agt.,
254 Canal-st, N. Y.

HORATIO EAGLE, No. 254 Canal Street, Rooms of the AMERICAN GAS-LIGHT JOURNAL, near Broadway, New York. Agent for the sale of Standard Parliamentary Fifteen hole Argand Burners, and all other Gas-Burners in use Also, Standard Photometric Sperm Candles, and the Photometric Apparatus complete.

PARAFFINE, Bleached, in Cakes, and Candles of all brands, for sale by HORATIO EAGLE, Agt.,
254 Canal street, N. Y.

STANDARD Photometric Candles. —Owing to a number of Applications made to me for information concerning the supply of the "Standard Sperm Candles," used in Photometries, I have obtained a supply, from which I can furnish those who require them with full directions for use.

T. W. PARMELE,
No. 4 Irving Place, New York.

CRUDE PETROLEUMS, Paraffine and Coal Oils, suitable for Refiners' use, for sale by HORATIO EAGLE, Agt.,
254 Canal street, N. Y.

KEROSENE, Albertine, Coaline, Carbon, Columbian, Empire State, Franklin, Knickerbocker, New York, Paraffine, Vesta, and all other brands of Coal Oil, for Burning and Lubricating purposes.

HORATIO EAGLE, Agt.,
254 Canal street N. Y.

COAL OIL.—10,000 Gallons Coal Oil, of very superior quality and color, for sale by DIETZ & CO.,
Lamp Manufacturers,
No. 132 William-st., N. Y.

ALBERTINE COAL OIL.—Warranted Pure and superior to any ever before offered for sale in this market; received direct from the New Brunswick Oil Works.

WHITMAN BROS. & CO.,
Agents, 72 Beaver-st., N. Y.

COAL OIL.—10,000 Gallons Celebrated Kerosene Coal Oil, 5,000 Gallons Boston Coal Oil, and other brands, at $1.25 per gallon.

STANFORD BROTHERS,
Pacific Oil and Camphene Works, cor. of Front and California streets, San Francisco, Cal.

EMPIRE STATE COAL OIL CO.— Manufacturers of Refined, Bleached, and Deodorized Coal Oil, Factory on Smith street, Brooklyn, L. I; Store, 240 Pearl street, corner Burling Slip, New York.

CHEMICAL OIL WORKS, Stamford, Conn.—Theodore Ladd. Office 178 Pearl street, New York. Burning and Lubricating Coal Oils, Coalene, Paraffine, Kreosote, Picric Acid, &c.

HENDRICKSON & SHATTUCK, Manufacturers of the Excelsior Lubricating Oil, Philogene and Paraffine Oils; also, Dealers in Sperm, Lard, Whale, Elephant, Tanners', Tallow, Coal, Neatsfoots, Paint and other Oils, Office, No. 22 Cedar street, between William and Pearl streets.

D. W. HENDRICKSON,
ALBERT G. SHATTUCK,
New York.

DEPOT AND WAREROOM of the New-York Columbian Oil Company, 58 Courtland street, New York.

G. M. WHEATON, Agent.

NEWTON OIL CO.—Manufacturers and Dealers in Illuminating Coal-Oil, Cordage Oil, Spindle Oil, Rosin Burning Oil, Painters' Oil, Curriers' Oil, Naphtha, Paraffine, Pitch and Tar, Asphaltum Varnish; also, Paraffine Lubricating Oil for Machinery. No. 42 Water street, Boston.

Rosin Oil and Rosin.—For sale of our own manufacture a superior article of ROSIN OIL, for Gas purposes. Also Refined Oil. For shipment in secure iron-bound barrels, or by any single barrel.

Address MARYLAND GAS COMPANY, No. 6 Bank of Baltimore Building, Baltimore, Md.

P. S. This Company is also prepared to construct their superior Patented GAS WORKS of any capacity, from that required for a private dwelling, hotel, church, college or factory, to such as will supply cities and towns, complete in all their parts for the manufacture of GAS, from either Rosin Oil, Coal, or Rosin.

FRANKLIN COAL OIL WORKS. —Robert A. Chesebrough & Co., Depot, 112 John street, New York. Works on Red Hook, Brooklyn. Manufacturers of Paraffine, Benzole, Naptha, Distilled Crude Oil, Axle Grease, Pitch, Illuminating, Lubricating, Binnacle and Head Light Coal Oils. Also, Agents for the Aladdin Coal Oil Works, Pittsburgh. Coal Oil Lamps of all kinds, at the lowest prices.

J. L. McREA, Dealer in Coal Oils and Lamps, Binnacle and Signal Light Oils, 139 Water street, New York.

DANIEL WADSWORTH & CO., Coal Oil Manufacturers, Wholesale Dealers in Oils and Naval Stores, and Commission Merchants.

DANIEL WADSWORTH,
DECIUS WADSWORTH,
207 Pearl street, New York.

COAL-OIL LAMPS.—1,200 Dozen Coal Oil Lamps, Dietz's unrivalled Burner, the most simple, convenient and economical Lamp in use.

No. 132 William-st., N. Y.

MARSH'S PATENT ROSIN or Sun-Light Gas-Works, for Private Dwellings, Hotels, Factories, Railway stations, Sugar-Houses, Towns, &c. By the peculiar construction of the Retorts, the largest amount of decomposing surface is obtained in the smallest space. 2d. Gas is manufactured from crude rosin, without the least deposit of carbonaceous matter in the retorts or pipes: thus enabling them to be operated continuously, generating rapidly the best and cheapest illuminating gas obtained from this material. ALFRED MARSH & CO.,
241 Broadway, New York.

WET & DRY GAS METERS.— D. McDonald & Co., No. 51 Lancaster street, Albany, N. Y., Manufacturers of Station-Meters, Wet-Meters, Dry-Meters, Fancy, Experimental and Show-Meters, Gasholders for testing Meters, Pressure Gages, &c. First-class workmen only employed, and the very best materials used. Meters sealed by the State Inspector of New York. We guarantee entire satisfaction in every case

IRICK, COLE & CO., Lumberton Iron Works, Lumberton, Burlington Co., N. J., Manufacture Cast Iron Water and Gas Pipes., and Connections of all kinds, and every description of Gas Works Castings, Tank Plates, Columns, Lamp Posts, Cast Iron Rails, all of the very best material and workmanship. The City of Brooklyn, N. Y., has already used near 6,000 tons Water Pipes, manufactured at our Works.

PHILADELPHIA GAS FIXTURE Works.—Warner, Miskey & Merrill, Manufacturers, Store, No. 718 Chestnut street, Philadelphia Warner, Peck & Co., No. 376 Broadway, New York, would respectfully inform the public that they continue to Manufacture all kinds of Gas Fixtures, Lamps, Girandoles, Bronzes, &c., and that their large and varied stock comprises the simplest as well as the most elaborate patterns, designed by their French artists. They also continue to keep at their store, 376 Broadway, a large and full assortment of all their manufactured Goods. Dealers and others are invited to call and examine.

GAS FIXTURES AND FITTING, No. 707, Broadway, New York.

The largest and best selected assortment of Gas Fixtures and French Bronzes in the City for sale, at very low prices, by

STEPHEN PHILBIN,
707 Broadway,
Between Washington Place and 4th-st.

JAMES RENWICK SMEDBERG, Consulting and Constructing

GAS-ENGINEER,

SAVANNAH, GEO.

REFERENCES:

CHARLES ROOME, Esq., Pres. Man. Gas Co., N. Y.
J. K. BRICK, Esq., Eng'r Brooklyn Gas Co., "
Messrs. ELLIMAN BROTHERS, New-York.
F. T. WILLIS, Esq., Pres. Savannah Gas Co.
J. A. SABRATON, Esq., Eng'r. Man. Gas Co., N. Y.

HENRY H. LINVILLE, JAS. R. SMEDBERG.

LINVILLE & SMEDBERG, Machinists and Engineers,

SAVANNAH, GEO.,

Manufacturers of Steam Engines, Sugar Mills, Gin Gearing, Saw Mills, and every Description of Wrought and Cast Iron Work.

References: N. A. Hardee & Co., Andrew Low & Co., F. T. Willis, Esq., Erwin & Hardee, Brigham, Baldwin & Co., Claghorn & Cunningham.

SALE OF THE NEW YORK KEROSENE Oil Works, by order of the Supreme Court, under the direction of PHILO T. RUGGLES, Receiver.—ANTHONY J. BLEECKER, SON & Co., will Sell at Auction, under the direction of Philo T. Ruggles, Receiver, on the Tenth day of May, 1860, at 12 o'clock at noon, at the Works of the Company situate in Newtown Creek, in the town of Newtown, county of Queens, the Works and property of the North American Kerosene Oil Company.

The said works are described as follows:

DESCRIPTION OF THE KEROSENE OIL WORKT, SITUATE ON NEWTOWN CREEK, ABOUT 1¼ MILE FROM GREENPOINT FERRY.

1. The Works cover 7 176-1000 acres of ground, and have a bulkhead on Newtown Creek, 487½ feet in lenth, with two large derricks on same.
2. Nineteen Pipes for decomposing coal, capacity 550 tons.
3. One Brick Oil Cistern, with pipes, &c., complete
4. One Oil Trap, connected with sewer leading from pipes.
5. One building on end of still-house, 42½ feet in length, 12½ feet wide, containing 3 Cylinder boilers 36 in. x 30 feet, with one No. 3 Worthington feed pump, connections complete for same.
6. Four No. 5 Worthington Pumps.
7. One Fire-Proof Still-House, with iron and slate roof, 76 feet in lenth, and 42½ feet wide, containing 6 stills, with cast iron condensers, and 3 wrought iron condensing tanks complete; a distilling capacity of 9000 gallons.
8. One Wrought Iron Tank, 4000 gallons capacity.
9. One Fire-Proof Still House, with iron and slate roof, 151 feet in length and 42½ feet wide, containing 12 stills, with wrought iron condensers, and condensing tanks complete; a distilling capacity of 18,000 gallons.
10. Three Wrought Iron Receivers for stills, 500 gallons each.
11. One three-ton Fairbank's Platform Scale.
12. Blacksmith Shop, connected with Still-House, containing Bellows, Anvil and Forge.
13. One Well, 7 feet diam., 7 feet water.
14. One Frame Building, used for office and laboratory.
15. One Brick Building, 52 feet square, with sheds, used as Cooper's Shop and Storehouse, with lot of tools.
16. Two Mixing Tanks, capacity 1400 galls.
17. One Grindstone.
18. One Steam Glue-pot.
19. One Gas-Holder.
20. One Lead lined Tank, 6,000 gallons capacity —(underground.)
21. One Wrought Iron Tank, 3,000 galls. capacity—(underground.)
22. One Wrought Iron Tank, 3,000 galls. capacity, in shed.
23. One Still-house, 100 feet long and 52 feet wide, with 11 stills, with copper condensers and condensing tanks complete, distilling capacity 16,500 galls.
24. One No. 5 Worthington Water Pump.
25. One Wooden Water Tank, on roof.
26. One eight-horse stm. Flue Boiler and Pump.
27. One Fifty " " "
28. One Eight horse Steam Engine (Burdon's).
29. Two Rotary Pumps.
30. One Grindstone.
31. One lead-lined Tank (under ground) 6,000 galls. capacity.
32. Three Wrought Iron Receiving Tanks, 2,800 galls. capacity.
33. One Line Main Shafting, 54 feet long, with 11 pulleys.
34. Two 10-inch Rubber Driving Belts.
35. One Well, 6 feet diam., 6 feet water.
36. One Fire-Proof Still-House, 17½ feet long and 17 feet wide, with 2 Stills, copper condensers and condensing tanks complete, distilling capacity 3,000 galls.
37. One brick building, with composition roof, containing 2,000 galls. Wr't Iron Tanks, steam and water connections complete.
38. Two Evaporating Pans, 3,000 galls. each.
39. One Wrought Iron Tank, (under ground) 500 galls. capacity.
40. One Fire-Proof Still-House, with iron and slate roof of 100 feet long and 50 feet wide, containing 8 Stills, Copper Condensers, and 4 Wr't Iron Condensing Tanks, with connections incomplete; distilling capacity 12,000 galls
41 One Fire-Proof Still-House, iron and slate roof 100 feet square, with 16 Stills and 17 Copper Condensers and 8 Wr't Iron Condensing Tanks, with oil and steam pipes complete, distilling capacity 24,000 galls.
42. Sixteen Wrought Iron Receiving Tanks, 1,200 galls. each.
43. Two Storage Tanks, (wrought iron) 6,500 galls. each.
44. Two Oil Meters.
45. One Copper Steam Still, with worm.
46. One Worthington Pump, No. 3.
47. One Worthington Duplex Pump, No. 2.
48. Six Copper Cans.
49. Thirty-one Copper Pails.
50. Six Copper Measures, from ¼ to 5 galls.
51 One lot of Tin Cans.
52. One two story Brick Building, 52 feet 8 in. square, with 8 lead-lined Mixing Tanks, capacity 4,000 galls. each.
53. Five No. 5 Worthington Pumps.
54. One line Main Shafting.
55. Eight Counter Shafts and 16 Pulleys.
56. Eight 9½ inch Leather Belts.
57. Eight Upright Shafts for mixing tanks.
58. Sixteen Gears.
59. One Wr't Iron Tank, 200 galls capacity.
60. One Lead-Lined Box, 30 feet x 6 feet.
61. One Lead-Lined C. I. Tank, (under ground.)
62. One C. I. Air Chamber, "
63. Two Wr't Iron Tanks, 30,000 galls. each (under ground) outside,
64. One C. I. Tank, 2,000 galls. capacity, (under ground) outside
65. Two Oil Traps.
66. One Brick Engine House, 52 feet 8 in. x 23 feet, containing one 100 Horse Condensing Engine, in complete order. Also, 80 feet 44 in. Leather Belting, and one Main Shaft and Pulley.
67. One Well, 10 feet dia. and 9 feet water, (outside.)
68. One Hot Water Brick Cistern, 16 feet dia. do.
69. One brick fire-proof Boiler House, iron and slate roof, with chimney 130 high, containing two 60 feet x 42 in. Boilers, (plain cylinder) with one No. 5 Worthington Feed Pump.
70. One Wr't Iron Tank, 1,200 galls. capacity.
71. One Frame Building, with glass roof, containing 8 zinc lined tanks, 1,200 galls each; also, 2 sun tanks, 1,500 galls. each.
72. One two-story Frame Stable, with 6 stalls.
73. Nine Wr't Iron Tanks, 3,000 galls. each.
74. One " " 2,000 "
75. One " " 700 "
76. Ten Sledges, one cast iron ball, with clutch, 912 lbs., four Sheer Poles and lot of Rigging.
77. One Hose Carriage and 400 feet 2½ in. Rubber Hose.
78. One Hand Truck.
79. One Small Fairbank's Platform.

The above mentioned and described property, will be sold on the Tenth day of May, 1860, in one parcel, as constituting the works of the North American Kerosene Gas-Light Company. The sale will take place at the works of the Company, on Newtown Creek, at 12 o'clock of that day,

Immediately after the sale of the said works, will be sold on the premises a quantity of heavy Kerosene Oil, amounting to between 30,000 and 40,000 gallons. Also, a quantity of empty Kerosene barrels, a lot of old iron, two sets of Gas-fitters' and Steam-fitters' tools, four horses, one truck, three carts, and all the other loose property belonging to said Company, for the particulars of which, apply at the office of Philo T. Ruggles, Receiver, No. 20 Nassau street, New York.

Dated New York, April 2, 1860.

PHILO T. RUGGLES,
Receiver.

APPLETON'S IMPROVED GAS- Works, for Factories, Hotels, Dwellings, and Towns. The most simple and economical works in use, furnishing a superior light to coal gas at a cost of one half a cent per burner per hour. It does not injure trees, or plate, and is not affected by cold. For Circular and Terms apply to APPLETON & GRAHAM,
56 Washington street, Boston.

For Illustration of Works see AMERICAN GAS-LIGHT JOURNAL for April, page 213.

ROSIN GAS-WORKS, for Factories, Hotels, and Public Buildings. These works may be seen in operation at the Berkshire Woolen Mills, Great Barrington, Mass.; Manchester Mills, Manchester, Conn.; A. A. Van Alen and Co's. Factories, Stuyvesant Falls, N.Y., and many other places.

JAMES O MORSE & CO.,
GAS, STEAM AND WATER ENGINEERS,
76 John Street, New York.

OFFICIAL.

WATER WORKS, COVINGTON, Kentucky.

Sealed Proposals will be received by the City Clerk of Covington, Ky., until the 10th day of July, 1860, for a grant of the exclusive right to establish and operate Water Works in the City, for the term of twenty-five years; the said city at and at, any time after, the expiration of said time, to have the right to purchase the works, upon six months' notice having been previously given to the grantee of the right herein proposed to be transferred at a valuation by disinterested parties.

For further particulars address the undersigned.

By order of the City Council.

C. H. MOOAR,
Ch'n of Com. on Internal Imp'ts.
Covington, Ky., April 10th, 1860.

FIRE INSURANCE COMPANIES.

ATLANTIC,
No. 14 Wall street, New York.
CAPITAL $150,000—ASSETS $259,772.
Horatio Dorr, *Secy.* John D. Cocks, *Pres*

CITIZENS',
No. 67 Wall and 58 Bowery, New York.
CAPITAL $150,000—ASSETS $316,500.
Jas. M. McLean, *Secy.* Dan'l Burtnett, *Pres*

CITY,
No. 62 Wall street, New York.
CAPITAL $210,000—ASSETS $345,000.
Sam'l Townsend, *Secy.* Geo. S. Fox, *Prest.*

CONTINENTAL,
No. 18 Wall street, New York.
CAPITAL $500,000—ASSETS $905,681.
H. H. Lamport, *Secy.* Geo. T. Hope, *Pres*

EXCELSIOR,
No. 6 Broad street, New York.
CAPITAL $200,000—ASSETS $250,000.
H'y Quackenboss, *Secy.* Eugene Plunkett, *Pres.*

FIREMEN'S FUND,
No. 108 Broadway, New York.
CAPITAL $150,000—ASSETS $164,688.
H. Beeckman, *Secy.* Nathan B. Graham, *Prest*

FRANKLIN (*Philadelphia*),
No. 27 Wall street, New York.
CAPITAL $400,000—ASSETS $1,656,997.
J A. Bancker, *Agent.*

FULTON,
No. 40 Wall street, New York.
CAPITAL $200,000—ASSETS $290,000.
Jas. M. Rankin, *Secy* Wm. A. Cobb, *Prest*

GERMANIA,
No. 5 Beekman street, N. Y.
CAPITAL $200,000.
R. Garrigue, *Secy.* Maurice Hilger, *Prest*